ANNEX- 1 Minutes of Meetings

(1) Scope of Work on the Study for Establishment of Base Maps and Hazard Maps for GIS in the Republic of Nicaragua Agreed upon Between Nicaraguan Institute of Territory Studies and Japan International Cooperation Agency, Managua, 27th August, 2003
(2) Minutes of Meeting on the Study for Establishment of Base Maps and Hazard Maps for GIS in the Republic of Nicaragua Agreed upon Between Nicaraguan Institute of Territory Studies and Japan International Cooperation Agency, Managua, 27th August, 2003
(3) Minutes of Meeting on the Inception Report the Study for Establishment of Base Maps and Hazard Maps for GIS in the Republic of Nicaragua Agreed upon Between Nicaraguan Institute of Territory Studies and Japan International Cooperation Agency of Managua, 20th January, 2004
(4) Minutes of Meeting, Managua, 1st April, 2004
(5) Minutes of Meeting, Managua, 9th September, 2004
(6) Minutes of Meeting, Managua, 23rd February, 2005
(7) Minutes of Meeting, Managua, 7th March, 2005
(8) Minutes of Meeting, Managua, 21th March, 2005
(9) Minutes of Meeting, Managua, 24th June, 2005
(10) Minutes of Meeting, Managua, 21st November, 2005
(11) Minutes of Meeting, Managua, 25th November, 2005
(12) Minutes of Meeting, Managua, 21st August, 2006

SCOPE OF WORK
ON
THE STUDY
FOR
ESTABLISHMENT OF BASE MAPS AND HAZARD MAPS FOR GIS
IN
THE REPUBLIC OF NICARAGUA

AGREED UPON BETWEEN

NICARAGUAN INSTITUTE OF TERRITORY STUDIES

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

MANAGUA CITY
27, AUGUST, 2003

Claudio Gutiérrez Huete, Executive Director
Nicaraguan Institute of Territory Studies
(INETER)

Seiichi Tanioka, Leader
Preparatory Study Team
Japan International Cooperation Agency
(JICA)

Mauricio Gomez, Vice Minister
Secretary Economical Relations and Cooperation
Ministry of Foreign Affairs

Cristóbal Sequeira, Executive Secretary
National System for the Prevention,
Mitigation and Attention of Disasters
(SINAPRED)

I.INTRODUCTION

In response to a request of the Government of the Republic of Nicaragua(hereinafter referred to as "GRN"), the Government of Japan has decided to conduct the " Study for Establishment of Base Maps and Hazard Maps for GIS in the Republic of Nicaragua" (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of GRN.

The present document sets forth the scope of work with regard to the Study.

II.OBJECTIVES OF THE STUDY

The objectives of the Study are to:

1. prepare 1/50,000 topographic maps and GIS data covering the area of Pacific Ocean side of about 20,000 km2 to be used by various users for different purposes including hazard maps;
2. prepare hazard maps and GIS data for priority areas to be used for prevention and mitigation of hazards by volcano eruption and lahar, earthquake, flood and tsunami; and
3. transfer technology.

III.STUDY AREAS

1.The 1/50,000 topographic maps and GIS data shall cover the western area of Nicaragua, approximately 20,000 km2.

The Study area of the 1/50,000 topographic maps is shown in Appendix-1

2. Hazard maps shall cover the following areas.

(1) Volcano eruption and lahar (1/50,000)

Volcanic Zone Telica-El Hoyo

(2)Earthquake (1/50,000)

Managua metropolitan area

(3)Flood(1/50,000)

River La Maravilla located in Masachapa

(4)Tsunami(1/50,000)

Corinto City,Puerto Sandino City,Masachapa City and San Juan Del Sur City

The Study areas of hazard maps are shown in Appendix-2.

IV.SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study shall cover the following items.

1. 1/50,000 topographic maps and GIS data.

(1) Aerial photography

Black and White aerial photographs covering the Study area without existed aerial photographs shall be taken with a scale of 1/40,000 which is shown in Appendix-1.

(2) Control Point Survey, Leveling and Pricking

Control Point Survey, Leveling and Pricking shall be carried out.

(3) Aerial Triangulation

Aerial triangulation shall be carried out.

(4)Field identification

Topographic information shall be identified mainly using the aerial photographs.
The field identification shall be conducted in case that the information on the aerial photographs is difficult to be interpreted.

(5)Digital Plotting

Digital topographic data shall be plotted.

(6)Editing and Symbolization

The digital topographic data shall be edited and symbolized to print topographic line maps at tha scale of 1/50,000.

(7)Field Completion

Field completion shall be carried out.

(8)CD-ROM production

The digital topographic data shall be compiled into CD-ROM .

(9)Printing of maps

The digital topographic data shall be printed at the scale of 1/50,000.

2.Hazard Maps and GIS data

(1) Aerial photography

Color aerial photographs covering the Study area of volcano eruption and lahar shall be taken of with a scale of 1/20,000 which is shown in Appendix-2.

(2) Review of the extent of damages caused by the past natural disasters

Disaster records on damages shall be collected and reviewed.

(3) Review of the current physical conditions

Data on the current physical conditions necessary for hazard assessment shall be collected and reviewed.

(4) Geological and geomorphological survey

Geological and geomorphological survey necessary for hazard assessment shall be conducted.

(5) Simulation Activities

Natural phenomena causing disasters shall be evaluated by simulation method.

(6) Preparation of Digital data for GIS

Existing data necessary for hazard maps shall be digitized and structured.

(7) Preparation of hazard maps

Hazard maps and digital data shall be prepared.

3.Technology transfer

(1) In order to facilitate technology transfer to the counterpart personnel, a part of the above-mentioned items shall be undertaken by the counterpart personnel under the technical supervision of the Japanese Study team.

(2) In order to disseminate the outcome of the Study, seminars and workshops shall be organized in the course of the Study.

V.STUDY SCHEDULE

The Study shall be implemented in accordance with the tentative Study schedule shown in Appendix-3 The schedule, including report submission dates stated in the next clause (VI), is tentative and subject to be modified when both parties agree upon and any necessity that arises during the course of the Study.

VI.REPORTS AND FINAL PRODUCTS

JICA shall prepare and submit the following reports in English and Spanish to GRN. In case any contradiction arises in writing, the English text shall prevail.

1. Inception Report
   20 copies — At the commencement of the Study
2. Progress Reports
   20 copies — At the end of the first and second years
3. Draft Final Report
   20 copies — At the end of the third year

The government of Nicaragua will present its comments to JICA within one month after the receipt of the Draft Final Report.

4. Final Report
   20 copies — At the end of the Study
5. Final products
   (1) Aerial Photographs (Black and white 1/40,000, Color 1/20,000)
      a. Negative film of aerial photographs — 1 set
      b. Digital data of aerial photographs — 1 set
      c. Contact prints of aerial photographs — 1 set
   (2) Digital data files (e.g. CD-ROM)
      a. 1/50,000 scale topographic maps — 2 sets
      b. Hazard maps — 2 sets
   (3) Print out of maps
      a. 1/50,000 scale topographic maps — 500 sets
      b. Hazard maps — 500 sets

VII.UNDERTAKING OF GRN

1. GRN shall accord privileges, exemptions and other benefits to the Japanese study team (hereinafter referred to as "the Team") in accordance with the Agreement on technical cooperation between GRN and Government of Japan signed on October 20,1998.

2. GRN shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of , or otherwise connected with, the discharge of their duties in the implementation of the Study , except when such claims arise from gross negligence or willful misconduct on the part of the members of the Team.

3. INETER shall act as the counterpart agency to the Japanese study team and also as the coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. INETER shall, at its own expense, provide the Team with the following in cooperation with other agencies concerned:

(1) Security-related information as well as measures to ensure the safety of the team;

(2) Information as well as support in obtaining medical service;

(3) Available data (including maps, photographs and newly observed hydrologic data) and information related to the Study ;

(4) Counterpart personnel,

(5) Suitable office space with necessary equipment ; and

(6) appropriate number of vehicles with drivers, and

(7) Credentials or identification cards.

VIII.UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures:

(1) to dispatch, at its own expense, the Japanese Study team to the Republic of Nicaragua; and

(2) to pursue technology transfer to the Nicaraguan counterpart personnel in the course of the Study.

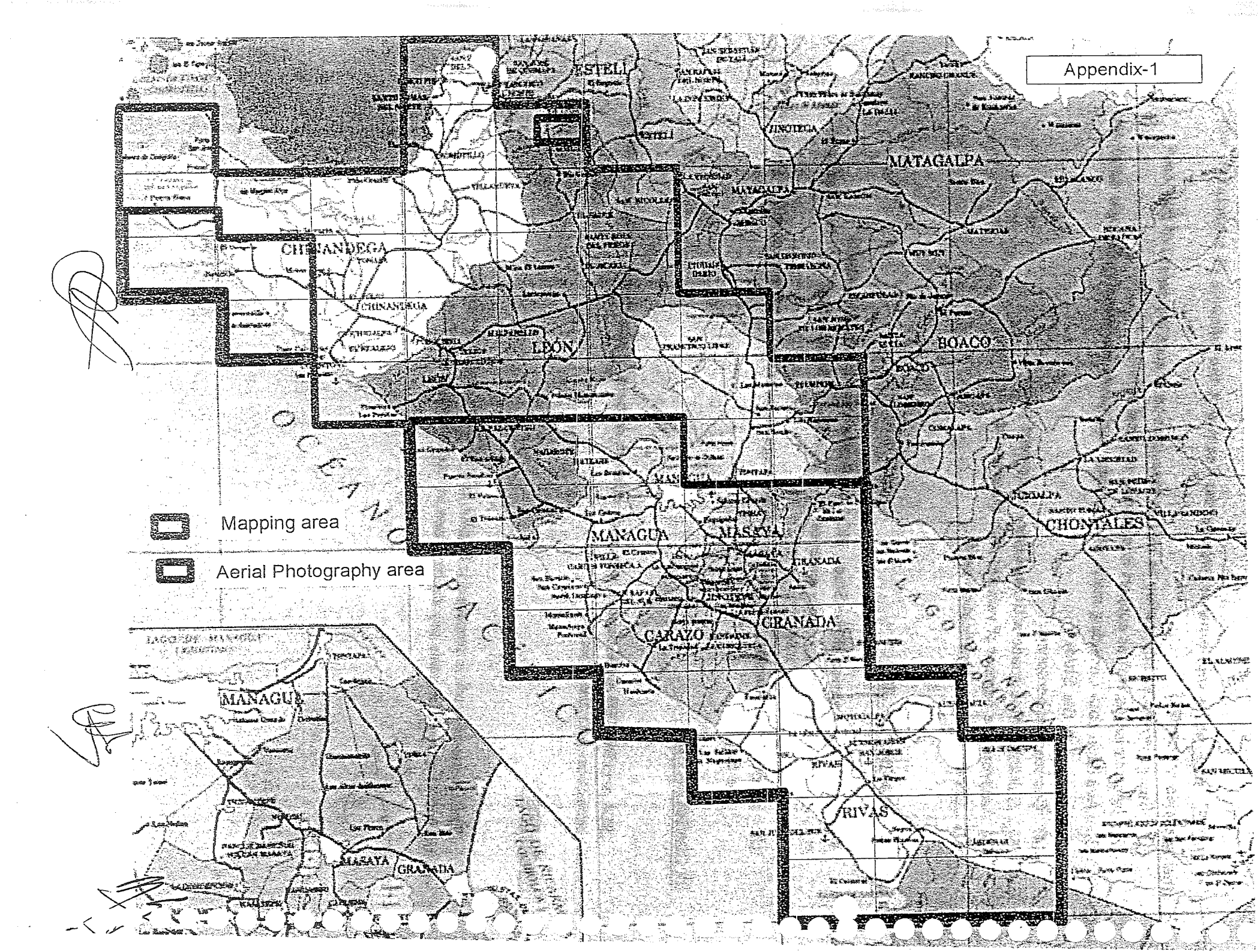
IX.CONSULTATION

JICA and INETER shall consult with each other in respect of any matter that may arise from or in connection with the Study.

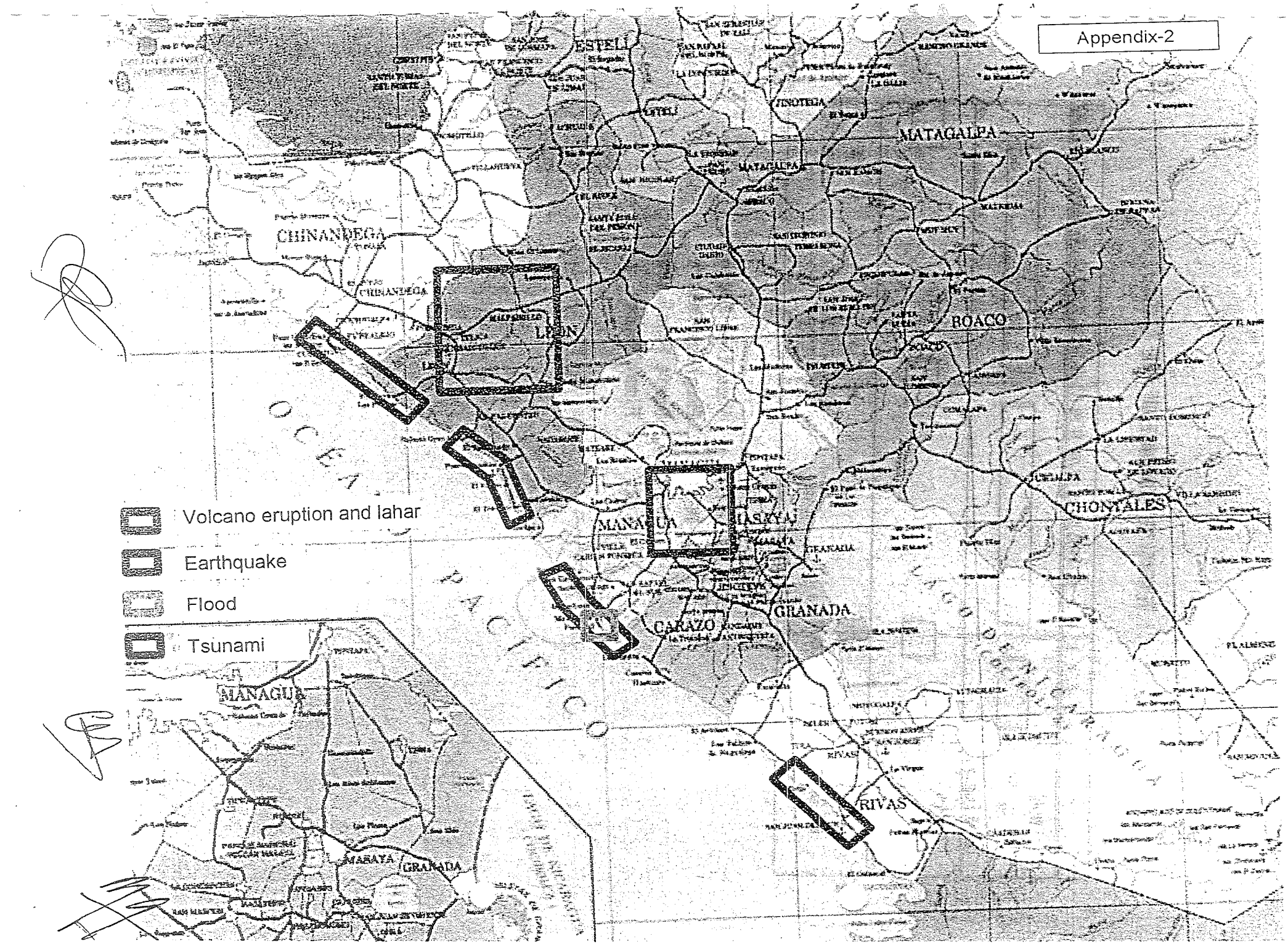
X.OTHERS

The Scope of Work is prepared in English and Spanish, and both versions are signed by the both partners. In case any doubt arises in interpretation, the English text shall prevail.

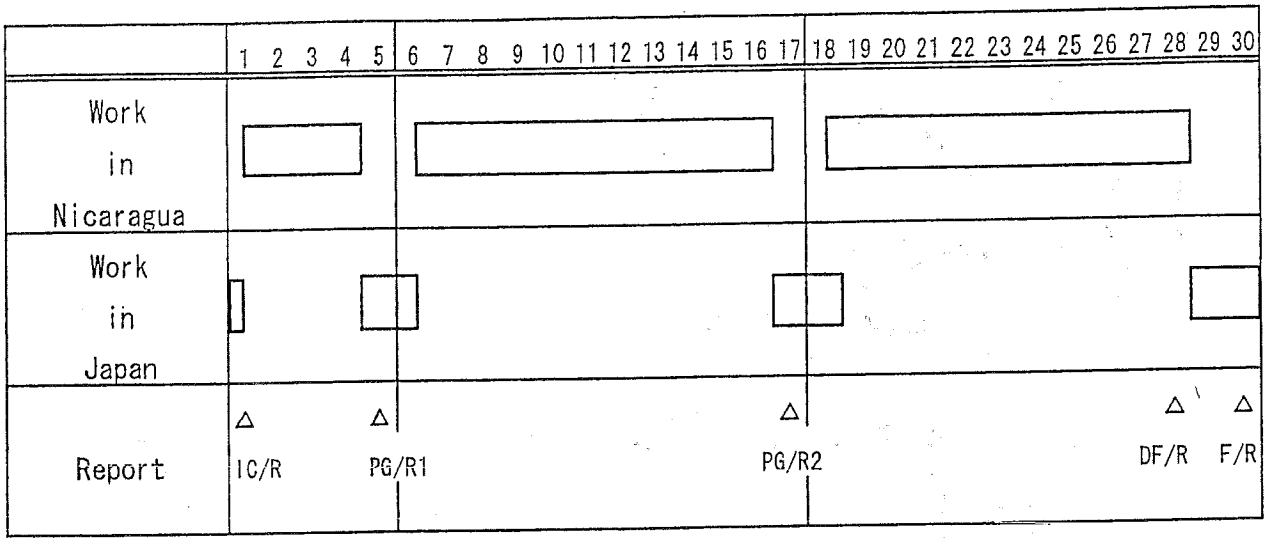
Appendix-1


Mapping area
Aerial Photography area
ESTELI
MATAGALPA
CHINANDEGA
LEON
BOACO
MANAGUA
MASAYA
CHONTALES
GRANADA
CARAZO
RIVAS

Appendix-2


ESTELI
MATAGALPA
CHINANDEGA
LEON
ROACO
MANAGUA
MASAYA
CHONTALES
GRANADA
CARAZO
RIVAS
Volcano eruption and lahar
Earthquake
Flood
Tsunami
MANAGUA
MASAYA
GRANADA

TENTATIVE SCHEDULE OF THE STUDY



IC/R : Inception Report
PG/R : Progress Report
DF/R : Draft Final Report
F/R : Final Report

MINUTES OF MEETING
ON
THE STUDY
FOR
ESTABLISHMENT OF BASE MAPS AND HAZARD MAPS FOR GIS
IN
THE REPUBLIC OF NICARAGUA

AGREED UPON BETWEEN

NICARAGUAN INSTITUTE OF TERRITORY STUDIES

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

MANAGUA CITY
27,AUGUST, 2003

Claudio Gutiérrez Huete, Executive Director
Nicaraguan Institute of Territory Studies
(INETER)

Seiichi Tanioka, Leader
Preparatory Study Team
Japan International Cooperation Agency
(JICA)

Mauricio Gomez, Vice Minister
Secretary Economical Relations and Cooperation
Ministry of Foreign Affairs

Cristóbal Sequeira, Executive Secretary
National System for the Prevention,
Mitigation and Attention of Disasters
(SINAPRED)

The Japanese Preparatory Study Team (hereinafter referred to as "the Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Seiichi Tanioka visited the Republic of Nicaragua from 17 to 29 August 2003 to discuss the Scope of Work for the " Study for Establishment of Base Maps and Hazard Maps for GIS in the Republic of Nicaragua" (hereinafter referred to as "the Study").During their stay in Republic of Nicaragua , the Team held a series of meetings with the officials of Nicaraguan Institute of Territory Studies (hereinafter referred to as "INETER") and the authorities concerned. A list of participants is given in Appendix.

Through these meetings, both sides have completed the Scope of Work and confirmed the following points:

1. Counterpart Personnel

Both sides recognized the necessity of technology transfer to the staff of the relevant organizations of the Government of the Republic of Nicaragua (hereinafter referred to as "GRN") so that GRN builds up the capability to produce and revise digital topographic maps and hazard maps by themselves. Based on the recognition, the GRN shall provide sufficient counterpart personnel at its own expense in the course of the Study.

2. Securing the Safety

The Team requested to secure the safety for the Study Team especially against the danger of mines during the field survey.

INETER agreed to arrange required measures for the Study Team in cooperation with relevant organizations.

3. Aerial Photography

Both sides agreed, in case that aerial photography is not completed within the scheduled duration in terms of area coverage and quality which will be designated in the contract on account of the unseasonable weather or inevitable accidents, to extend the duration of aerial photography and the following Study within the limit of one (1) year, and INETER take the responsibility to take necessary administrative action for aerial photography.

Both sides also agreed to consult with each other in respect of changing the method of the Study, in case the aerial photography is not completed within the limit of one (1) year due to the above-mentioned reason.

4. Permission for aerial photography

INETER is responsible to secure necessary permission for aerial photography by a foreign registered aircraft for the implementation of the Study.

5. Hydrometeorological observation

INETER shall carry out hydrometeorological observation, at least for one year, such as precipitaion of upper basin and water level and flow of the river in lower basin.

6. Office Space and Equipment

INETER agreed to provide the furnished office space in INETER with necessary equipment and utilities such as desks, chairs, photocopy machines ,telephone lines and internet access, etc.

7. Vehicles

INETER expressed their wish that the vehicles required for the Study Team would be arranged by JICA.

The Team promised to convey the request to JICA Headquarters.

8. Duty-Free Clearance

Both sides agreed that INETER shall act as consignee of the equipment, and shall carry out all the necessary procedure, such as duty-free clearance, etc., and otherwise INETER shall pay all other necessary expenses for import procedure for the equipment.

Both sides also agreed that the equipment thus imported shall be used exclusively for the implementation of the Study under the supervision of the Study Team.

9. Training of Counterpart Personnel in Japan

INETER requested that counterpart personnel take advantage of training in Japan related to the Study to promote effective technology transfer.

The Team promised to convey this request to JICA Headquarters.

10. Publicity of the Final Report and Products

The Team requested INETER that the final report and products to be prepared by the Study shall be open to the public immediately after completion upon request of users.

INETER understood the request and agreed to take full responsibility for necessary procedure.

List of Participants

Nicaraguan Institute of Territory Studies (INETER)

Claudio Gutiérrez Huete	Director Ejecutivo
Pedro Miguel Vargas Carvajal	Director General de Geodesia y Geología
Luis Palacios Ruíz	Director General de Recursos Hídricos
Wilfried Strauch	Director General de Geofísica
Gonzalo Medina Pérez	Director Técnico de Geodesia y Cartografía
Isidro Jarquín Vélez	Director de Cartografía
Josué Donado Figueroa	Director de Fotogrametría.
Ramón Avilés Aburto	Director de Geodesia
Antonio Alvarez	Director de Geología
Emilio Taravera Martínez	Director de Sismología
Guillermo Chávez Ardanza	Geólogo Georiesgo SIG
Isaías Montoya Blanco	Director Técnico de Recursos Hídricos
Edy Cruz Potosme	Jefe del Departamento de Estudios Hidrológicos

Secretary of Economical Relations and Cooperation (SREC)

Ministry of Foreign Affairs

Isolda Frixione Miranda	Directora General de Gestión Bilateral
María Auxiliadora Vindel	Oficial de Gestión de Cooperación Bilateral

National System for the Prevention, Mitigation and Attention of Disasters (SINAPRED)

Cristóbal Sequeira	Secretario Ejecutivo
Erasmo Vargas	Director Desarrollo Territorial
José Humberto Romero	Jefe del Departamento de Informática

JICA Preparatory Study Team

Seiichi Tanioka	Team Leader
Tamio Isobe	Precision Management Planning
Ryoichi Kojiroi	Hazard Map Planning
Hideki Yokoyama	Study Planning
Kenji Chujo	Basic Map and Equipment Planning
Kosei Otoi	Geography Information and Technology Transfer Planning
Aki Higuchi	Interpreter

MINUTES OF MEETING

ON

THE INCEPTION REPORT OF THE STUDY

FOR

ESTABLISHMENT OF BASE MAPS AND HAZARD MAPS FOR GIS

IN

THE REPUBLIC OF NICRAGUA

AGREED UPON BETWEEN

INSTITUTO NICARAGÜENSE DE ESTUDIOS TERRITORIALES

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

MANAGUA CITY,

20th JANUARY, 2004

Ing. Claudio Gutiérrez Huete
Executive Director
Nicaraguan Institute of Territorial Studies (INETER)

Mr. Fujio ITO
Leader of the Study Team
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Licda. Isolda Frixione Miranda
General Director of Bilateral Issues
Secretariat of Economical Relations and Cooperation
MINISTRY OF FOREIGN AFFAIRS

Mr. Hideki YOKOYAMA
JICA Head Quarters

Cristóbal Sequeira
Executive Secretary
National System for the Prevention, Mitigation and Attention of Disasters (SINAPRED)

The JICA Study Team (hereinafter referred to as "the Team") headed by Mr. Fujio ITO visited the Republic of NICARAGUA on 11th January 2004 in order to carry out The Study for Establishment of New Base Maps and Hazard Maps for GIS in the Republic of NICRAGUA (hereinafter referred to as" the Study"). The Team had a series of meetings and discussions based on the Inception Report of the Study with the officials of INSTITUTO NICARAGÜENSE de ESTUDIOS (hereinafter referred to as "INETER"). As a result of the discussion, The Inception Report was accepted by INETER.

The attendant list is attached in Appendix-1.

The summary of the discussion, which was agreed upon by both sides, is as follows:

1. Confirmation of undertaking matter by INETER

The Team confirmed the followings as undertaking matter of INETER:

(1) To provide counterpart personnel and office space connected with LAN for the Team.

(2) To provide necessary existing topographic maps, digital photographs and results of aerial triangulation for the study area.

(3) To provide transformation parameter between WGS84 and NAD27 and Geoid data of the study area.

(4) To provide all necessary existing data for hazard simulation and mapping.

2. Setting up of Steering Committee

Both sides agreed to set up the Steering Committee consisting of the Executive Directors of INETER, SINAPRED and a representative of Foreign Affairs for the Study. The first meeting will be held in the beginning of February 2004 at INETER.

3. Uploading the project information to website

Both sides agreed to upload the JICA project information to website of INETER. Uploading data will be prepared by INETER based on the Inception Report.

4. Discussion of equipment specification for On the Job Training (OJT)

Several discussions were made between INETER and the Team for the specification of Equipment for OJT.

The following systems were finally specified:

(1) Digital photogrammetry workstation and upgrade of the existing system

(2) Data editing system

(3) GIS system for mapping and hazard simulation model

(4) Map symbolization

(5) Output device (plotter)

(6) Others (UPS network, etc)

5. OJT area for mapping

It is decided that two map-sheets (EL TRÁNSITO and NAGAROTE) will be mapped by INETER on OJT program under the supervision of the Team.

6. Map symbols and their application rule

Map symbols, codes, attributes and their application rules will be discussed continuously by the end of March 2004 and agreed upon between INETER and, the Team.

7. OJT items

Based on the Inception Report, both side agreed the following technical transferring items during the project implementation:

7-1 Digital mapping at scale of 1/50,000

(1) Ground control survey
Pricking and Land marking

(2) Field verification

(3) Training of Stereoscope, Photo-interpretation, Handy GPS use, and Fieldwork

(4) Aerial triangulation by Digital photogrammetory workstation

(5) Digital plotting for planimetric feature by Digital photogrammetory workstation

(6) DEM and contouring by Digital photogrammetory workstation

(7) Data editing

(8) Topology structuring by ArcInfo

(9) Field completion

(10) Map symbolization

(11) GIS Database creation and Analysis

It should be noted because the precision of the existing map is low, the digitization of the analog map and editing were omitted from the Table 12 of the Inception Report from the judgment that it is meaningless.

7-2 Hazard mapping

Earthquake (Managua, metropolitan area)

(1) Field verification
    Surface soil structure and properties
    Study of the past disaster records
    Survey of active faults
    Seismicity, catalogue
    Attenuation curve
(2) Modeling of scenario earthquake
    Modeling of source faults
    Modeling of subsurface ground
(3) Simulation
(4) Verification of simulation using past earthquake records
(5) Organizing results
    Hazard map legend design

Volcano (Area encompassing Volcano Telica and El Hoyo complex, including Cerro Negro)

(1) Field verification
    Classification of lava, volcanic ash and other items
    Lahar studies
    Study of the past volcanic event records
(2) Landform analyses using aerial photographs
    Identification of lava, lahar, and mud slide ranges
(3) Design of eruption model
    Eruption types, scale, eruption locations and others
    Design of meteorological settings
(4) Simulation
(5) Verification of simulation using past volcanic event records
(6) Organizing results
    Hazard map legend design

Flood

(1) Field verification
    Discharge and water level observation
    Study of the past flood records
(2) Aerial photo interpretation for micro-landform interpretation
    Natural levee, flood plain and others
(3) Design of a rain fall and water level model
    Setting of rain fall patterns
    Setting of discharge and water levels
    Setting of initial points of flooding
(4) Simulation
(5) Verification of simulation using past flood records
(6) Organizing results
    Hazard map legend design

Tsunami (Corinto, Puerto Sandino, Masachapa, San Juan del Sur)

(1) Field verification
    Study of the past tsunami records
(2) Landform studies
    Handling of bathymetries of off-shore and coastal area
    Marine structures and their effect on run up analysis
    DEM generation
(3) Design of earthquake models
    Modeling of Tsunami source fault
(4) Simulation
    Tsunami wave propagation analysis
    Linear wave height analysis and non-linear run up analysis
(5) Verification of simulation using past tsunami records
(6) Organizing results
    Hazard map legend design

Appendix 1

Attendant list

Nicaraguan side

INETER

Ing. Claudio Gutiérrez Huete - Executive Director of INETER

Ing. Javier García Romano - Technical Assistanto to the Executive Director

Dr. Wilfried Strauch - General Director of Geophysics

Ing. Luis Palacios Ruíz - General Director of Hydric Resources

Ing. Isaías Montoya Blanco - Technical Director of Hydric Resources

Ing. Gonzalo Medina Pérez - Technical Director of Geodesy and Cartography

Lic. Zoila Herrera Alegría - General Director of Planning and Projects

Ing. Isidro Jarquín Vélez - Director of Cartography

Mr. Josué Donado Figueroa - Director of Photogrammetry

Ing. Pedro Miguel Vargas Carvajal - General Director of Geodesy and Cartography

SINAPRED

Ing. Crintóbal Sequeira - Execuive Secretary

Ing. Erasmo Vargas - Director of Territorial Planning

Japanese side

JICA Study Team

Mr. Fujio ITO - Team Leader

Mr. Yoshiaki Otoku - Deputy Team Leader (Supervisor of Aerial Photography and Plotting Editing)

Mr. Osamu Nishii - Deputy Team Leader (Earthquake and Geology Study)

Mr. Daikichi Nakajima - Supervisor of Control Point Survey and Field Identification 1

Mr. Kiyofumi Tamari - Supervisor of Control Point Survey and Field Identification

Mr. Hisashi Mori - Study Coordinator

Dr. Ikuo Katayama - Advisor

JICA Advisory Committee

Mr. KENJI Chujo

Minutes of Meetings on Topographic Mapping

For

The Study for Establishment of Base Maps and Hazard Maps for GIS

In

The Republic of Nicaragua

Agreed Upon Between

Nicaraguan Institute of Territorial Studies

And

Japan International Cooperation Agency

Managua

April 1st, 2004

Ing. Claudio Gutiérrez Huete
Executive Director
Nicaraguan Institute of Territorial Studies (INETER)

Ing. Yoshiaki Otoku
Deputy Leader of the Study Team
(In Charge of Topographic Map)
Japan International Cooperation Agency (JICA)

Ing. Pedro Miguel Vargas Carvajal
General Director of Geodesy and Cartography
INETER

Ing. Osamu Nishii
Deputy Leader of the Study Team
(In Charge of Hazard Studies)
JICA

During the first stage of fieldwork in Nicaragua and in relation to the elaboration of the topographic maps for "The Study for the Establishment of Base Maps and Hazard Maps for GIS in the Republic of Nicaragua" (hereinafter referred to as "the Study"), the JICA Study Team (hereinafter referred to as "the Team") and the Nicaraguan Institute of Territorial Studies (hereinafter referred to as "INETER") agreed upon the following:

1. The working method for topographic map elaboration is as stated in Appendix 2. The details of map compilation, if not mentioned in the given document, will be decided in accordance with the "Product Specifications for 1:50,000 Scale Topographic Maps of Foreign Areas" published by NGA (National Geospatial-Intelligence Agency), the then NIMA or DMA.

2. The compilation symbols used for the maps will basically follow the norms contained in NGA's "Manual of Conventional Symbols-On the Scale of 1/50.000." Nevertheless, the items of the compilation symbols adopted for the Study will be limited to those listed in the Appendix 3, which were selected by mutual consent, between INETER and the Team. Similarly, the application norms will be partially modified. The Team will discuss again with INETER any modification to be made to the agreed upon items in the process of project implementation.

3. INETER will prepare the information classified as Category 3 for the table in the Appendix 3 and provide it to the Team.

4. The Team will elaborate the digital version of the compilation symbols mentioned above before the beginning of the second stage of fieldwork in Nicaragua and present them to INETER for its approval.

5. So far as the subject represented on the hazard maps and their legends are concerned, the Team will hold a discussion with INETER during the second year of work in Nicaragua (February, 2005).

6. The specification of the marginal information for the paper printed topographic maps will also follow NGA's design specifications. The Team will discuss the details again with INETER on the basis of the sample map that the Team will prepare before the second stage of fieldwork in Nicaragua

7. The neatlines of the maps elaborated for the Study will correspond to the dividing lines that section the ellipsoid WGS84 each 10 minutes of latitude and 15 minutes of longitude respectively. The projection is UTM. The UTM coordinates of the four corners of each sheet will be officially established by INETER and the coordinate list will be provided to the Team in May, 2004.

8. INETER will give the final approval to the product of field completion, which will be carried out during the second year of work in Nicaragua. The final compilation map will be elaborated on the approved product.

9. The Team will discuss with INETER again about the note to be included at the lower portion of each printed map in accordance with the instructions given by JICA.

Minutes of Meeting on Topographic Mapping
For
The Study for Establishment of Base Maps and Hazard Maps for GIS
In
The Republic of Nicaragua

Agreed Upon Between
Nicaraguan Institute of Territorial Studies
And
Japan International Cooperation Agency

Managua
September 9th , 2004

Ing. Claudio Gutiérrez Huete
Executive Director
Nicaraguan Institute of Territorial Studies (INETER)

Ing. OSAMU Nishii
Deputy Leader of the Study Team
Japan International Cooperation Agency (JICA)

During the second stage of the fieldwork in the First Year of the project on "The Study for the Establishment of Base Maps and Hazard Maps for GIS in the Republic of Nicaragua" (hereinafter referred to as "the Study"), the JICA Study Team (hereinafter referred to as "the Team") and the Nicaraguan Institute of Territorial Studies (hereinafter referred to as "INETER") agreed upon the following:

1. Delivery of intermediate results

INETER received the following materials for the On the Job Training (OJT):

(1) 2 sets of color contact print photograph covering the volcano study for the On the Job Training
(2) 1 set of digital ortho-photograph (black and white) at scale of 1/25,000 covering the new photographing area
(3) 1 set of scanned photograph covering the new photographing area

2. System installation for OJT program

The Team reported that all the equipments were installed based on the specifications which were agreed on January 2004. INETER confirmed the following equipments:

(1) Digital photogrammetry workstation
(2) Data editing system
(3) GIS system for mapping and hazard simulation
(4) Map symbolization system
(5) Output device (plotter)
(6) Others (UPS network, etc)

INETER agreed to check the quantity and working condition for all systems together with the Team. Especially for ESRI products, INETER will communicate with delivery dealer because of the absence of GIS specialist of the Team who left Nicaragua before installation.

3. Steering Committee

The second Steering Committee was held in the presence of the directors of INETER, SINAPRED and a representative of the Ministry of Foreign Affairs. The counterpart personnel and Japanese experts reported their progress form March till August 2004.

4. Final map symbol and its application rule

Based on the map symbol and its application rule which were agreed in March 2004, further discussion in detail was made and several modifications were decided.

5. Preparation of topographic name

INETER agreed to prepare the topographic name information in digital format by January 2005.

6. Marginal information

The Team showed the original design of Marginal information and discussed.
INETER proposed some modification and more detail.
Finally, the design of Marginal Information was agreed.

7. Progress of the fieldwork

Topographic mapping

The team reported that the field verification of the topographic mapping was carried out as scheduled except one map sheet No.2855-II (ACHUAPA).
Because of the rainy season, ACHUAPA was difficult to access for field verification. The Team decided that the field verification would carry out in January 2005 in the dry season.

Hazard Mapping

The Team reported that the field verification of the hazard mapping was carried out as scheduled.

8. Progress of OJT-1

The Team reported that the following OJT was implemented:
(1) Field verification by GPS and ortho-photograph
(2) Digital photogrammetory
(3) GIS basic technology

As for the Digital photogrammetory, there was not enough time to train the counterpart technicians in all training programs because of the delay of the installation. The Team proposed to continue the training in the OJT-2 in January 2005. INETER accepted the proposal.

9. Request from INETER

INETER requested several additional data acquisition for the project to the Team.
Requested works are:
(1) Bathymetric survey in the Masachapa coastal waters for Tsunami hazard simulation
(2) Profiling of the Maravilla River for Flood hazard simulation
(3) Preparation of topographic maps (Approx.200sqkm) at a scale of 1/5000 in Managua city for The study on Improvement of Water Supply System in Managua
(4) Basic facility information map for natural disaster prevention for GIS application

Concerning the request from INETER, the Team promised to convey to JICA Headquarters, Tokyo Japan.

Attendant list

Parte Nicaragüense
INETER

Ing. Claudio Gutiérres Huete	Director Ejecutivo
Ing. Pedro Miguel Vargas Carvajal	Director General de Geodesia y Cartografía
Ing. Gonzalo Medina Pérez	Director Técnico de Geodesia y Cartografía
Ing. Isidro Jarquín Vélez	Director de Cartografía
Ing. Mayra Silva Díaz	Director de Fotogrametría

Parte Japanesa
Misión de Estudio de la JICA

Ing. Osamu Nishii	Jefe Adjunto (Estudios Sísmicos y Geológicos)

MINUTES OF MEETING

ON
THE INCEPTION REPORT OF THE STUDY
FOR
ESTABLISHMENT OF BASE MAPS AND HAZARD MAPS FOR GIS
IN
THE REPUBLIC OF NICRAGUA

AGREED UPON BETWEEN
INSTITUTO NICARAGÜENSE DE ESTUDIOS TERRITORIALES
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

MANAGUA CITY,
23th FEBRUARY, 2005

Ing. Claudio Gutiérrez Huete
Executive Director
Nicaraguan Institute of Territorial Studies (INETER)

伊藤二治男

Mr. Fujio ITO
Leader of the Study Team
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

The JICA Study Team (hereinafter referred to as "the Study Team"), headed by Mr. Fujio ITO visited the Republic of NICARAGUA from 11th January, 2005 in order to carry out the second year phase of the Study for Establishment of New Base Maps and Hazard Maps for GIS in the Republic of NICARAGUA (hereinafter referred to as" the Study"). Counterpart agency is INSTITUTO NICARAGÜENSE de ESTUDIOS TERRITORIALES (hereinafter referred to as "INETER").

Concerning the request from INETER in the Minutes of Meeting on the 9th September 2004, the Study Team informed them that JICA accepted their requests. That is;

(1) Bathymetric survey in the Masachapa coastal waters for Tsunami hazard simulation
(2) Profiling of the Maravilla River for Flood hazard simulation
(3) Preparation of topographic maps (Approx.200sqkm) at a scale of 1/5,000 in Managua city area for the study on Improvement of Water Supply System
(4) Basic facility information map for natural disaster prevention for GIS application

The Study Team requested the cooperation of INETER to execute above-mentioned additional work during their stay in Nicaragua, and INETER agreed to give necessary assistance.

During the stay in the Second Year, the Study Team and INETER agreed upon the following:

1. Acceptance of the Progress Report

The Study Team reported the progress of the first year' activity based on the Progress Report with INETER. As a result of the discussion, The Inception Report was accepted by INETER.

2. Steering Committee

The third Steering Committee was held on 22nd February 2005, in the presence of the directors of INETER, SINAPRED and a representative of the Ministry of Foreign Affairs. Also Steering Committee invited Managua Municipality, ENACAL, and the Ministry of Environment and Natural Resources as GIS

users for the Topographic map at a scale of 1/5,000. The counterpart personnel and Japanese experts reported their progress from September 2004 till February 2005.

3. Map symbols and their application rule for 1/5,000 Topographic map

The Study Team had several discussions for the Map symbols and their application rule for 1/5,000 topographic in Managua Municipality. As a result of this discussion, the Final map symbols were agreed.

Spheroid: WGS84

Projection: UTM

Contour line: Index contour 2m

Supplemental contour 1m

4. Preparation of topographic name for 1/50,000 topographic map

According to Minutes of meeting on 9th September 2004, the Study team received the topographic name information in digital format from INETER.

5. Marginal information and Sample Map

The Team showed the sample map with Marginal information prepared by Adobe Illustrator. After INETER engineers made some corrections, the design of Marginal Information and Map symbols were agreed.

6. Final Map Symbols and their application rule

Based on the map symbols and their application rule which were agreed in August 2004, further discussion in detail was made and several modifications were decided.

7. Specification of GIS database.

Based on the draft of Specification of GIS database prepared by the Study Team, INETER had several technical discussions with the Study Team. As a result of discussions, Specification of GIS database was defined.

8. Progress of the Field work

1) Field work for Topographic mapping at a scale of 1/50,000

The team reported that the field verification and Ground control survey were carried out for the map sheet No.2855-II (ACHUAPA).

2) Field work for Topographic mapping at a scale of 1/5,000 in Managua

The team reported that the field verification and Ground control survey were carried out by topographic mapping at a scale of 1/5,000 in Managua.

GPS surveying has not been carried out since the Study Team was provided the final aerial triangulation results by Managua Municipality via INETER. For the re-aerial triangulation, the minor leveling was done for 110km to control the vertical accuracy.

Leveling network was closed to the existing Benchmark which is based on Mean See level (MSL). As a result of computation, leveling accuracy is good enough for the mapping at a scale of 1/5,000.

3) Basic Facility Information Map for natural disaster prevention for GIS application

The team reported that the field verification for Basic Facility Information Map was carried out as scheduled plan.

4) Bathymetric surveys in the Masachapa coastal waters for Tsunami hazard

The team reported that Bathymetric survey in Masachapa was carried out as scheduled plan.

5) Profiling of the Maravilla River for Flood hazard simulation

The INETER carried out the Profiling of the Maravilla River and the Study Team received a survey result.

9. Progress of OJT-2

The Team reported that the following OJT was implemented:

(1) Digital photogrammetry

(2) GIS basic technology

(3) Map symbolization

10. Recommendations from INETER

INETER recommend several matters to the Study Team for the implementation of third year. Their recommendations are:

(1) Time schedule of field completion for topographic mapping at a scale of 1/50,000 is recommended to be changed to November, 2005 because of a field condition in Nicaragua.

(2) Field compilation of topographic mapping at a scale of 1/5,000 in Managua is recommended because of a secular change since the year 2000. The aerial photographs, which Managua Municipality provided to the Study Team, were taken in the year 2000. There have been a lot of changes in Managua area since that time.

(3) Concerning the area of topographic mapping at a scale of 1/5,000 area in Managua, the southern part of mountainous area (approx.80sqkm) also has to be mapped. Managua Municipality is planning to construct a dam and reservoir to collaborate with Ministry of Environment and Natural Resources for a flood protection. INETER will support to the Study Team for the extension of the mapping area. Concerning the accuracy, INETER accepts to use the photographs which were taken by JICA Study Team in 2004 for the area to be mapped in Southern part (approx.80sqkm).

Concerning the recommendation from INETER, the Study Team promised to consider these things in the third year of the project.

Appendix 1

Attendant list

Nicaragua side

INETER

Ing. Claudio Gutiérrez Huete –Executive Director of INETER

Ing. Pedro Miguel Vargas Carvajal –General Director of Geodesy and Cartography

Ing. Javier García Romano – Technical Assistant to the Executive Director

Dr. Wilfried Strauch – General Director of Geophysics

Ing. Luis Palacios Ruíz – General Director of Hydrologic Resources

Ing. Isaías Montoya Blanco – Technical Director of Hydrologic Resources

Ing. Gonzalo Medina Pérez – Technical Director of Geodesy and Cartography

Lic. Zoila Herrera Alegría – General Director of Planning and Projects

Ing. Isidro Jarquín Vélez – Director of Cartography

Sr. Josué Donado Figueroa – Director of Photogrammetry

Japanese side

JICA Study Team

Mr. Fujio ITO: Team Leader

Mr. Osamu Nishii: Deputy Team Leader (Earthquake and Geology Study)

Dr. Ikuo Katayama: Technical Advisor

Mr. Kiyofumi Tamari: Supervisor of Control Point Survey and Field Identification

Mr. Hisashi Mori: Study Coordinator

MINUTES OF TECHNICAL MEETING
ON
THE STUDY
FOR
ESTABLISHMENT OF BASE MAPS AND HAZARD MAPS FOR GIS
IN
THE REPUBLIC OF NICRAGUA

AGREED UPON BETWEEN
NICARAGUAN INSTITUTE OF TERRITORY STUDIES
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

MANAGUA, NICARAGUA

March 7, 2005

Ing. Gonzalo Medina Pérez
Technical Director of Geodesy and
Cartography
Nicaraguan Institute of Territory Studies
(INETER)

Ing. Hidetoshi Kakiuchi
GIS Specialist of the Study Team
Japan International Cooperation Agency
(JICA)

The JICA Study Team headed by Mr. Fujio ITO visited the Republic of Nicaragua from January 11, 2005 to March 22, 2005 in order to carry out the second year phase of the Study for Establishment of Base Maps and Hazard Maps for GIS in the Republic of Nicaragua. Counterpart agency is Nicaraguan Institute of Territory Studies (hereinafter referred to as "INETER").

During the stay in the second year, INETER and the JICA Study Team held technical meetings several times, and agreed upon the specifications of the final products mentioned below. The decided items are the following:

1. About the 1:50,000-scale topographic maps

1) Specifications of extraction rules for digital plotting data
The detail table of the specifications is shown in Appendix. The data format should be DXF ASCII format version 12 or its equivalent. The data type must be used only Point, Line, Polyline and Single line text.

2) Specifications of map symbolization for digital data
The data format should be AI format for Adobe Illustrator version 10 or its equivalent. The detail table of the specifications shall be agreed between INETER and the JICA Study Team while Mr. Yamaya (until March 22, 2005), supervisor of map symbolization stays here in Nicaragua.

3) Specifications of marginal information on the printing maps
The details are shown on the sample-printing map by INETER side. The minutes of technical meeting about "Specifications of map symbolization for digital data" and "Specifications of marginal information on the printing maps" shall be made between INETER and the JICA Study Team while Mr. Yamaya, supervisor of map symbolization stays here in Nicaragua.

4) Specifications of GIS data for the level 50,000
The detail table of the specifications is shown in Appendix. The data format should be ArcInfo Coverage version 7 or its equivalent.

2. About the 1:5,000-scale topographic maps

1) Specifications of extraction rules and map symbols for digital plotting data
The data format should be DXF ASCII format version 12 or its equivalent. The data type must be used only Point, Line, Polyline and Single line text. The detail table of the specifications shall be agreed between INETER and the JICA Study Team while Mr. Yamaya, supervisor of map symbolization stays here in Nicaragua.

Notes

1) The above specifications shall be improved under an agreement between INETER and the JICA Study Team, if some difficulties or incoherence on the product processing confront in the middle of processing.

2) The minutes of technical meeting is prepared in English and Spanish, and the both partners sign the both versions. In case any doubt arises in interpretation, English text shall prevail.

List of Participants

Nicaraguan Institute of Territory Studies (INETER)

Ing. Gonzalo Medina Pérez	Technical Director of Geodesy and Cartography
Ing. Isidro Jarquín Vélez	Director of Cartography

JICA Study Team

Ing. Awadh Kishor Sah	GIS Specialist
Ing. Hidetoshi Kakiuchi	GIS Specialist
Ing. Kiyofumi Tamari	Supervisor of Control Point Survey
Ing. Kozo Yamaya	Supervisor of Map Symbolization
Ing. Minori Onaka	Supervisor of Digital Plotting