SUPPORTING REPORT H

HAZARD MAP AND RISK MAP BY GIS

SUPPORTING-H : HAZARD MAP AND RISK MAP BY GIS

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1. INTRODUCTION

Hazard map and risk maps are one of the most important outputs of the Study. In order to make these maps, Geographic Information System (GIS) has been introduced. GIS was also employed for the Study to analyze the present conditions, to formulate a Master Plan for the Study and to conduct a Feasibility Study on the Priority Project.

In the Study, basic spatial data of topographic and geological conditions, land use, hydrological data and metrological data, the other relevant data have been collected.

GIS is a powerful and useful tool for the Study to collect and store the data, and to organize and identify related data. It is also used to support to wake a conclusion.

In the Study, GIS data has been developed using the software ArcView3 from ESRI Inc,. ArcView3 is a very sophisticate software and has data capability with ArcInfo and many other GIS and CAD systems.

In this Supporting Report-H, the structure of the hazard map, the risk maps and other GIS database made by the Study Team is described.

<Merits and Demerits of GIS are described as follows:>

(1)Merit

◯Quick query ◯Print out ◯Paperless

◯Digital data is not worn out ◯Data can be used for another system etc.

(2)Demerit

◯Initial Cost ◯Data maintenance etc.

It's necessary to maintain GIS data continuously after the Study!

2. STRUCTURE OF GIS

2.1 GIS DATA MADE IN THE STUDY

The data input in the GIS in the Study are shown in the table below.

Table H.2.1 GIS Data List (1/2)

		GIS Data (feature type)	Source and method to make data	Corresponding Supporting Report
1.Target Area 1/5000 ～ 1/10000	1.1 Digital Mapping	01.All data mosaic (polygon, line) ・Contour, Road, River ・Capital building ,Water tank, Fence, Dike etc	Airplane picture survey (Orthophoto)	Supporting-A
		02.Contour 2001（line）		
		03.Road (polygon, line)		
		04.River (polygon, line)		
		05.Annotation (symbol)		
	1.2 Project	01.Project (line)		Supporting-F
	1.3 Flood area	01.Cross Section (line)	river survey	Supporting-A
		02.Flood area (polygon) Without project (5y,10y,15y,25y,50y,Mitch)	plot flood area by the result of flood analysis and contour ***1**	Supporting-C
		02.Flood area (polygon) With P/P (Priority Project) (10y,15y,50y,Mitch)		
		02.Flood area (polygon) With M/P (Master Plan) (15y,50y,Mitch)		
		03.Flood area and depth (grid) Without project (5y,10y,15y,25y,50y,Mitch)	translate vector to grid cell size 10m*10m	
		03.Flood area and depth (grid) With P/P (Priority Project) (10y,15y,50y,Mitch)		
		03.Flood area and depth (grid) With M/P (Master Plan) (15y,50y,Mitch)		
	1.4 Geology	01.Geology (polygon)	1.grond survey 2.map drawing 3.digitizing	Supporting-B
		02.Landslide map (polygon)		
		03.Slope failure map (polygon)		
		04.Detrius (polygon)		
		05.Other (polygon, line)		
		06.Geology (grid)	1.translate vector (contour) to grid(DTM) 2.calculate slope and aspect ***2** 3.calculate slope failure rank by using geology and slope	
		07.Elevation (grid)		
		08.Slope (grid)		
		09.Aspect (grid)		
		10.Slope failure analyzed map (grid)		
		11.Landslide damage area (polygon)	1.map drawing 2.digitizing	
		12.Slope failure damage area (polygon)		
		13.Landslide damage area (grid)	translate vector to grid cell size 10m*10m	
		14.Slope failure damage area (grid)		

Table H.2.1 GIS Data List (2/2)

		GIS Data (feature type)	Source and method to make data	Corresponding Supporting Report
1.Target Area 1/5000 ～ 1/10000	1.5 Land use planning	01.Colonia (polygon)	1.digitizing polygon 2.input census data (Pop, Household etc)	Supporting-J
		02.Build up area (polygon)	ground survey and reading airplane picture	
		03.Present land use (grid) ・Commercial, Forest etc	ground survey and reading airplane picture	
		04.Land use planning (grid)	grid overlay cell size 10m*10m	
2.Study Area 1/50000	2.1 Watershed	1-01Rain Station (point)	1.digitaizing rain station 2.inputing rain bservation data	Supporting-I
		1-02.R Value map (polygon)	1.rain observation station 2.make contour data	
		1-03.R Value map (grid)	translate vector to grid cell size 100m*100m	
		2-01.K point map (point)	1.digitaizing 2.inputing K data	
		2-02.K Value map (polygon)	1.rain observation station 2.make contour data	
		2-03.K Value map (grid)	translate vector to grid cell size 100m*100m	
		3-01.Contour (line)		
		3-02.DTM (grid)	translate vector to grid cell size 100m*100m	
		3-03.LS Value map (grid)	1.caliculation	
		4-01.Land use map (polygon)	landuse map (1984)	
		4-02.C Value map (grid)	translate vector to grid cell size 100m*100m	
		5-01.Erosion map (grid)	Overlay grid data	
		5-02.Micro basin (polygon)	Digitizing	
		5-03.Micro basin (grid)	translate vector to grid cell size 100m*100m	
3.Other	3.1 Bambu	01.Contour (line) 1/500	Ground survey	Supporting-A
	3.2 Reparto	01.Contour (line) 1/500	Ground survey	
	3.3 Pescado Lake	01.Contour (line) 1/500	Ground survey	
	3.4 Chortica river	01.Contour (line) 1/500	Ground survey	
	3.5 Water pipe	01.Water pipe (line)	Digitizing	Supporting-D
	3.6 Drain network	01.Drain (line)	Digitizing	
	3.7 Orthophto	01.Orthophto 1/10,000 Orthophto mosaic	Airplane picture survey mosaic Orthophtos 1/10000	Supporting-A

・All data made in the Study is shown in Appendix H.

***1 The method to make flood area map**

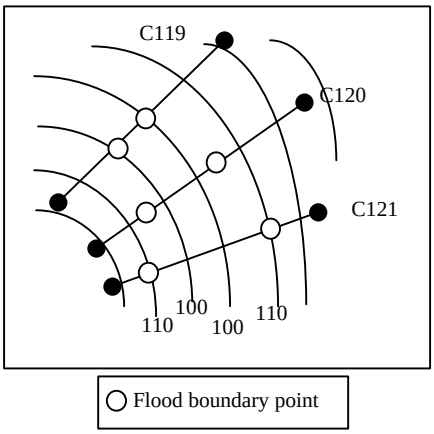
Step1>Using water level by flood analysis
in every cross section, to plot flood boundary point.

Cross section No	Water Level
:	:
C119	100
C120	105
C121	110
:	:

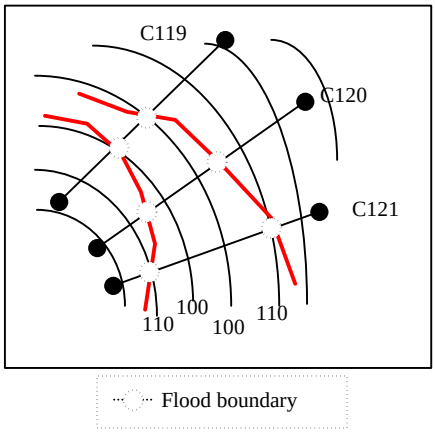
Step2>Using contour line, to connect flood boundaries.

Step3>Make polygon of the flood area.

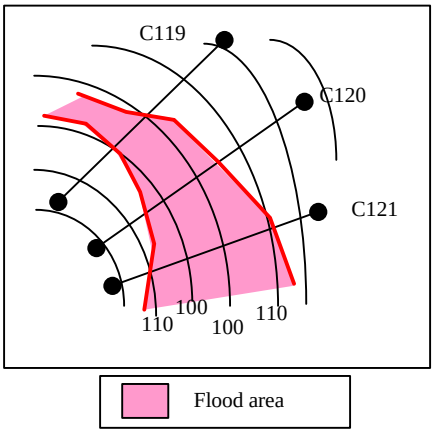
Step1



Step2



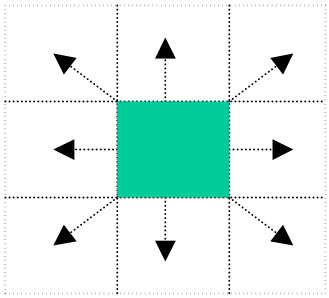
Step3



***2 The method to make slope and aspect map**

(1)Slope map
The slope degree of 8 directions are calculated and the maximum slope is selected for all cells.

(2)Aspect map
The direction of maximum slope is selected.



eight derections for slope calculation

2.2 STRUCTURE OF GIS DATABASE

2.2.1 STRUCTURE DIRECTORY

Structure of GIS Database made in the Study is shown in a table below.

Table H.2.2 Structure Directory

¥Shape	¥Target		¥DM.DWG	1-1-01
			¥Contour.shp	1-1-02
			¥Road.shp	1-1-03
			¥River.shp	1-1-04
			¥Annotation.shp	1-1-05
			¥Project.shp	2-1-01
			¥CrossSection.shp	1-3-01
		¥without	¥5y.shp 10y.shp 15y.shp 25y.shp 50y.shp Mitch.shp	1-3-02
		¥withPP	¥10y.shp 15y.shp 50y.shp Mitch.shp	
		¥withMP	¥15y.shp 50y.shp Mitch.shp	
			¥geology.shp	1-4-01
			¥Landslide.shp	1-4-02
			¥SlopeFailure.shp	1-4-03
			¥Detrius.shp	1-4-04
			¥Fault.shp Bank.shp Anticline.shp	1-4-05
			¥Landslide_damage.shp	1-4-11
			¥SlopeFailure_damage.shp	1-4-12
			¥Colonia.shp	1-5-01
			¥BuildupArea.shp	1-5-02
	¥Study		¥RainStation.shp	2-1-01
			¥Kpoint.shp	2-2-01
			¥Contour_100m.shp	2-3-01
			¥Landuse.shp	2-4-01
			¥MicroBasin.shp	2-1-04
	¥Other		¥Bamboo.DWG	3-1-01
			¥Reparto.DWG	3-2-01
			¥Choluteca.DWG	3-3-01
			¥Pescado.DWG	3-4-01
			¥WaterPipe.DWG	3-5-01
			¥Drain.shp	3-6-01
¥GRID	¥Target	¥without	¥5y.grid 10y.grid 15y.grid 25y.grid 50y.grid Mitch.grid	1-3-03
		¥withPP	¥10y.grid 15y.grid 50y.grid Mitch.grid	
		¥withMP	¥15y.grid 50y.grid Mitch.grid	
		¥without	¥5y_d.grid 10y_d.grid 15y_d.grid 25y_d.grid 50y_d.grid Mitch_d.grid	1-3-04
		¥withPP	¥10y_d.grid 15y_d.grid 50y_d.grid Mitch_d.grid	
		¥withMP	¥15y_d.grid 50y_d.grid Mitch_d.grid	
			¥Geology.grid	1-4-06
			¥Elevation.grid	1-4-07
			¥Slope.grid	1-4-08
			¥Aspect.grid	1-4-09
			¥SlopeFailure_analyzed.grid	1-4-10
			¥Landslide_Damage.grid	1-4-13
			¥SlopeFailure_Damage.grid	1-4-14
			¥Forest.grid Commercial.grid	1-5-03
			¥LandUsePlanning.GRID	1-5-04
	¥Study		¥R_Value.grid	2-1-02
			¥K_value.grid	2-2-02
			¥DTM.grid	2-3-02
			¥Slope_LS_value.grid	2-3-03
			¥LS_value.grid	2-3-04
			¥C_value.GRID	2-4-02
			¥Erosion.grid Erosion_Rank.grid	2-5-01
			¥MicroBasin.grid	2-5-03
¥Image	¥Other		¥Ortophoto_A1.tiff Ortophoto_A2.tiff Ortophoto_A3.tiff Ortophoto_B1.tiff Ortophoto_B2.tiff Ortophoto_B3.tiff Ortophoto_C1.tiff Ortophoto_C2.tiff Ortophoto_C3.tiff Ortophoto_D1.tiff Ortophoto_D2.tiff Ortophoto_D3.tiff Ortophoto_E *OrtophotoMosaic.tiff	3-7-01
¥COMMON_AVL				

2.2.2 DIRECTORY OF SHAPE FILE

All of the shape files are saved in the directory “Shape”. Shape file contains spatial data contains attribute data.

The directory “Common_AVL” is prepared for shape file that is commonly used in several thematic maps. The directory “Common_AVL” is prepared for the legend file that is commonly used in several maps.

2.2.3 DIRECTORY OF GRID FILE

The directory “Grids” is prepared for Grid data files.

2.2.4 DIRECTORY OF IMAGE FILE

Other directories are prepared for image files such as orthophoto image.

2.3 STRUCTURE OF GIS FILES

2.3.1 STRUCTURE OF SHAPE FILES

(1) Data type

There are two types of data in GIS. One is the spatial map data and the other is the text base attribute. The spatial map data keep location of features such as line, polygon, point and grid with their XY coordinates. Spatial maps have only information on location, area or length. These spatial data are saved in a shape file format in the world of ArcView3. Shape files should have a single type of feature.

Another type of data is text base attribute such as name of river, the observation data of the monitoring station and statistical figures etc. Any kinds of text data which explain the spatial data can be added to the attribute table. These are saved dbf file format (attribute table) in ArcView3.

Each shape file is dynamically linked with its attribute table. For example, the color of a feature of shape file will automatically changes based on the specified legend when attribute data is modified. Specific feature of shape file are automatically selected when some data is queried in the attribute table. On the other hand, the attribute will be automatically queried when the features on the map are selected by the mouse. The relationship between shape file and attribute tables is shown below. A shape file corresponds to a attribute table one by one.

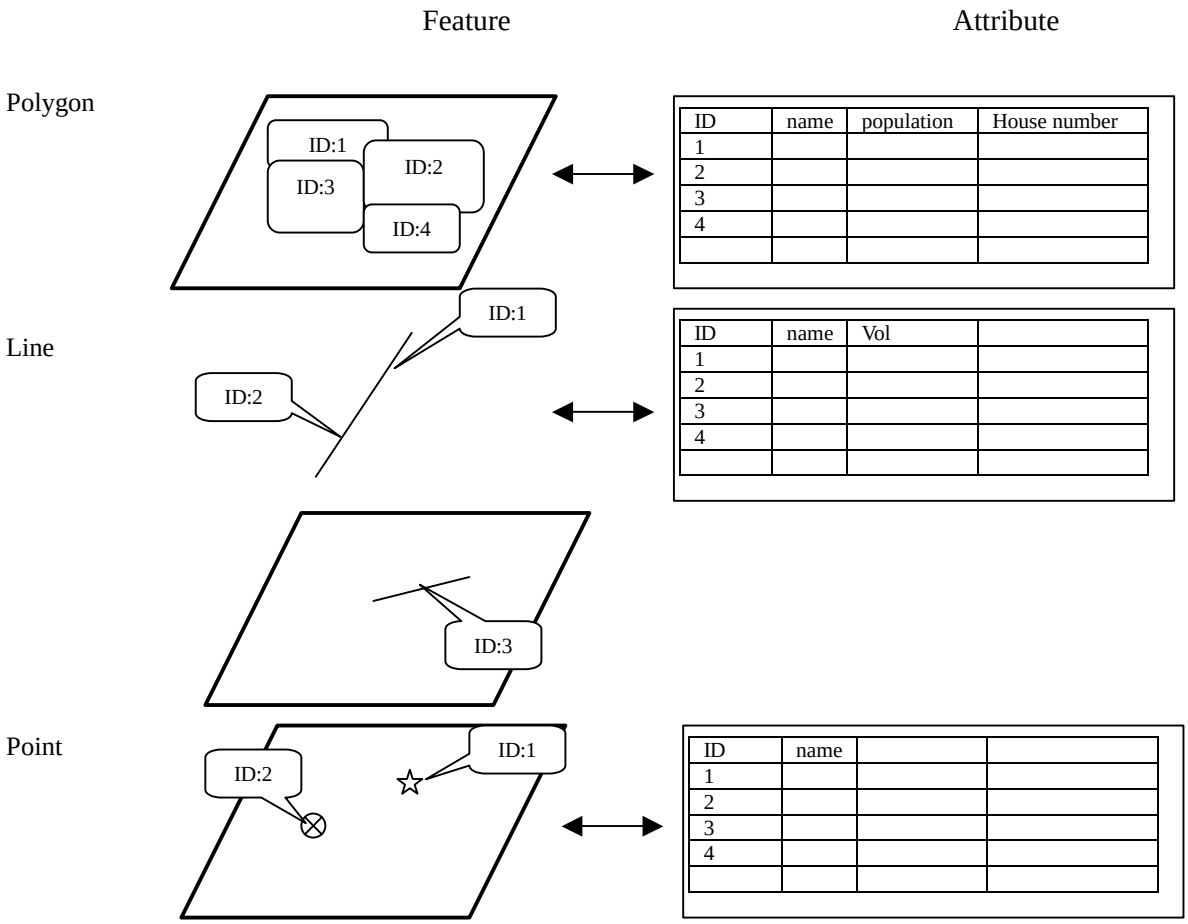


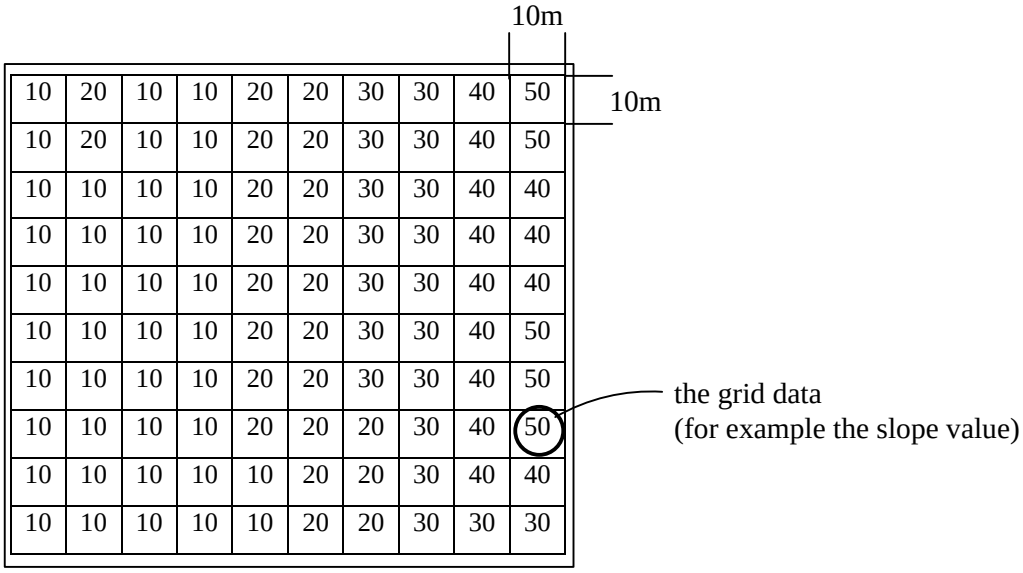
Figure H.2.1 Shape File Structure

(2) Relationship between Shape and Attribute

A shape file is a single theme that has only one group of features such as river system or road network etc. On the other hand, several shape files are necessary to make a thematic map. It is possible for ArcView3 to combine several shape files to make specific thematic map. Same shape file becomes a component of plural thematic maps. In this way, the modification of particular shape file can be automatically reflect to many thematic maps that include one. The figures list in Main Report and thematic map, which is composed of several files.

2.3.2 STRUCTURE OF GRID FILES

In the Study, grid data was used to make hazard map. Grid data structure is shown in the image below. In the Study, cell size is 10m square for hazard map building.



10	20	10	10	20	20	30	30	40	50
10	20	10	10	20	20	30	30	40	50
10	10	10	10	20	20	30	30	40	40
10	10	10	10	20	20	30	30	40	40
10	10	10	10	20	20	30	30	40	40
10	10	10	10	20	20	30	30	40	50
10	10	10	10	20	20	30	30	40	50
10	10	10	10	20	20	20	30	40	50
10	10	10	10	10	20	20	30	40	40
10	10	10	10	10	20	20	30	30	30

Figure H.2.2 Image of GRID File Structure

2.4 OTHER GIS ANALYSIS IN THE STUDY

In the Study, GIS Data is made in vector type at first and translates from vector to grid to calculate. Cell size is defined 10＊10m in the Study.

2.4.1 COUNTING OF POPULATION, HOUSEHOLD IN FLOOD AREA

Vector type data was made at first. Vector type data was translated to grid type data. Merging flood area data and Colonia data etc is counted population in flood area. Counting data is used for project estimate. The method to make flood hazard map is shown below.

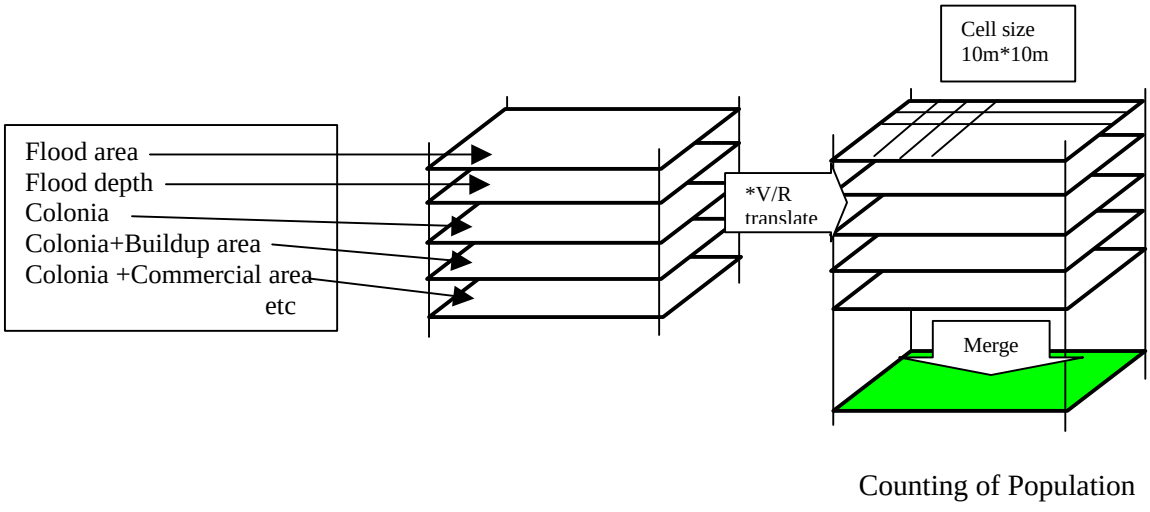


Figure H.2.3 Counting of Population, Household in Flood Area

*V/R translate

Vector type data is translated to grid type data. Grid cell is defined by 10 * 10m.

2.4.2 COUNTING OF POPULATION, HOUSEHOLD IN LANDSLIDE AND SLOPE FAILURE AREA

Vector type data was made at first. Vector type data was translated to grid type data. Merging landslide area data, slope failure area data and Colonia data etc is counted population in area. Counting data is used for project estimate. The method to make land slide and slope failure hazard map is shown below.

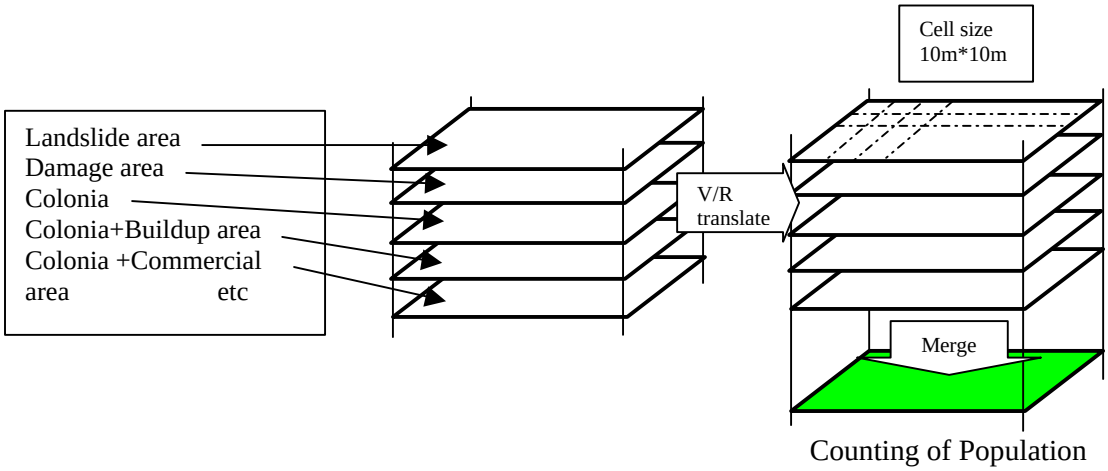


Figure H.2.4 Counting of Population, Household in Landslide Area

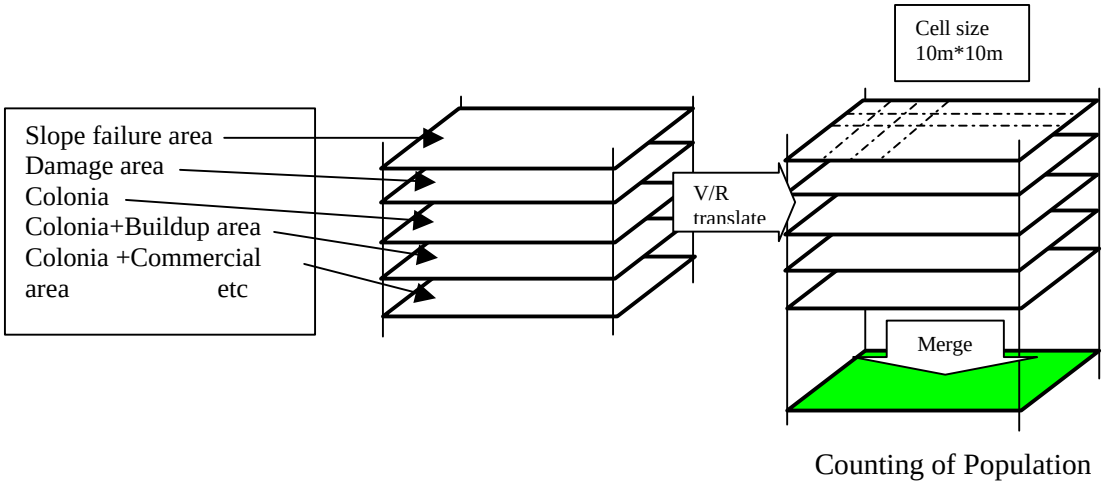


Figure H.2.5 Counting of Population, Household in Slope Failure Area

2.4.3 WATERSHED MANAGEMENT

Vector type data was made at first. Vector type data was translated to grid type data. Merging data is counted for population in Study Area. The method to make erosion map is shown below.

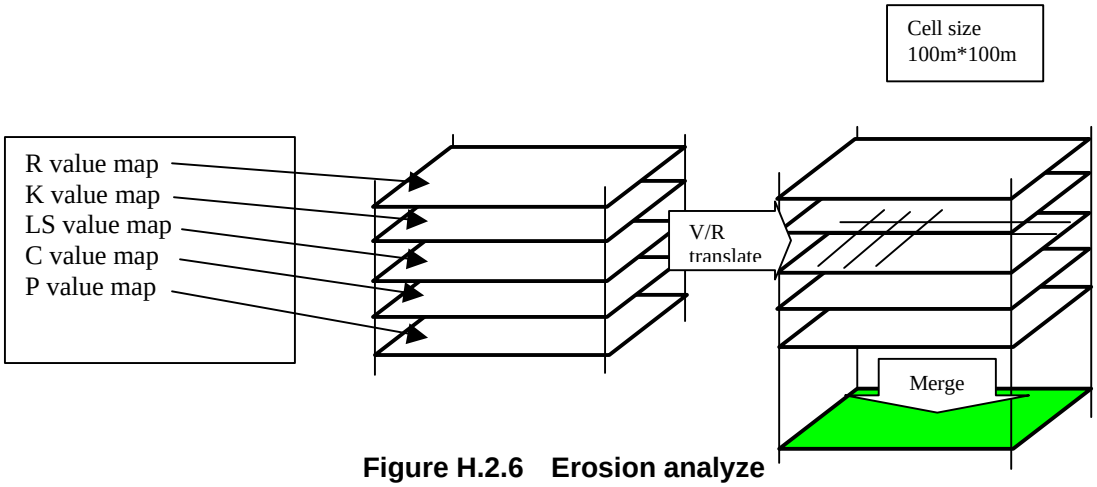


Figure H.2.6 Erosion analyze

2.5 OPERATION OF GIS

The functions of GIS used are shown in the table below. And options of ArcView that needed to use function are shown. The details are explained in the operation manual.

Table H.2.3 Functions of GIS used in the Study

Items		Function	ArcView Option
1.Start Quit	(1)	How to start GIS database system	
	(2)	How to quit GIS database system	
2.Display	(3)	How to display vector data	
	(4)	How to display grid data	SpatialAnalyst
	(5)	How to display image data	ImageAnalyst
3.Data Transfer	(6)	How to transfer vector to grid	SpatialAnalyst
	(7)	How to transfer grid to vector	SpatialAnalyst
4.Overlay	(8)	How to overlay vector data	SpatialAnalyst
	(9)	How to overlay grid data (GRID Merge)	SpatialAnalyst
	(10)	How to query vector data	
	(11)	How to query grid data	SpatialAnalyst
5.Other	(12)	How to make contour line by using point data	SpatialAnalyst
	(13)	How to calculate slope and aspect	SpatialAnalyst
	(14)	How to calculate flood depth	3DAnalyst

3. HAZARD MAP AND RISK MAP

Hazard maps and risk maps were prepared by GIS. The definition of a hazard map and a risk map is as follows:

- “Hazard map” is a map showing only natural phenomena.

- “Risk map” is a map showing both phenomena and damage.

The table below shows the list of hazard maps and risk maps created in the Study.

Table H.3.1 Hazard Map and Risk Map

	(1)Flood	(2) Landslide	(3) Slope failure
Hazard map	○Digital Mapping (Contour, Road, River etc) ○Flood area ・without Project ・with project	○Digital Mapping (Contour, Road, River etc) ○Landslide area map ○Landslide damage area	○Digital Mapping (Contour, Road, River etc) ○Geology map ○Elevation map (Slope/Aspect map) ○Slope failure area map ○Slope failure damage area
	disaster area can be displayed.		
Risk map	◎Hazard map ○Colonia ・Population ・Housshold ・Income etc	◎Hazard map ○Colonia ・Population ・Housshold ・Income etc	◎Hazard map ○Colonia ・Population ・Housshold ・Income etc
	both disaster area and estimated economic and social damage can be displayed.		

REFERENCES

1) Plan Operativo de Emergencia Rregión＃3, Documento Prelimina, COPECO

2) Lista de colonias, INE(Instituto Nacional de Estadísticas)

SUPPORTING REPORT H

APPENDIX H

APPENDIX H.1

GIS DATA LIST

GIS DATA List

Master Directory: Computer>>>> PODER C:¥Teguci¥¥

1. Digital Mapping and Geography

	Vector				GRID (10*10m Cell)	
	Items		Shape File Name		Items	Grid File Name
DM	2001 DM (Except Contour)	Roads	Final_data¥shapes¥digital_mapping_roads		-	-
		Rivers	Final_data¥shapes¥digital_mapping_rivers		-	-
		Annotations	Final_data¥shapes¥digital_mapping_anno	→		
Geography	1996 DM (Contour)	1 m. interval	Final_data¥shapes¥curvas_ig_1996		-	Final_data¥grids¥ig_96_dem
	2001 DM (Contour)	2.5 m. interval with elevation points	Final_data¥shapes¥Aerocarta_After_June8th¥aero_contours_with_ele_points	→	Elevation (1 m. grid cell size)	Final_data¥grids¥Aerocarta_After_June8th¥ aerodem_p
		2.5 m. interval without elevation points	Final_data¥shapes¥Aerocarta_After_June8th¥aero_contours_without_ele_points	→	Elevation (1 m. grid cell size)	Final_data¥grids¥Aerocarta_After_June8th¥ aerodem
	-		-		Slope	Final_data¥grids¥slope_10m
	-		-		Aspect	Final_data¥grids¥aspect_10m
3D Elevation Models TIN Format	2.5 m. interval with elevation points		3ds¥ Aerocarta_After_June8th¥TIN_sipoints			
	2.5 m. interval without elevation points (Spot Heights)		3ds¥ Aerocarta_After_June8th¥TIN_nopoints			

2. Geology

	Vector				GRID (10*10m Cell)		
	Items		Shape File Name		Items		Grid File Name
Geology	Geology Classes		Geo_f¥ geo classes	→			Geo_f¥grids¥geo_clas
	Faults		Geo_f¥ faults				
	Dip & Strike of Beds, Joints and Faults		Geo_f¥dips and strikes				
	Detritus		Geo_f¥detritus	→			Geo_f¥grids¥detri
	Land Slides		Geo_f¥landslide classes	→			Geo_f¥grids¥ lands_abc
	Existing Slope Failure Location		Geo_f¥slope failure	→			Geo_f¥grids¥ slo_fail
	Banks		Geo_f¥ banks	→			Geo_f¥grids¥ banks
	Anticline / Syncline		Geo_f¥ anti syncline				
	Landslide Direction		Geo_f¥ landslide direction				
	Land Slide(USGS)		Geo_f¥ usgs_landslides	→			Geo_f¥grids¥ usgs_lands
Slope Failure Analysis	Landslide Affected Areas		Geo_f¥dangerous_area				Geo_f¥grids¥ lands_dan
	Slope Failure Dangerous Areas		Geo_f¥slope_failure_danger (Rank 1 & 2)				Geo_f¥grids¥ slo_fail (Rank 1 & 2)
	Slope Failure Affected Areas		Geo_f¥slope_failure_danger (Rank 3)				Geo_f¥grids¥ slo_fail (Rank 3)
Maikoku	Contours from Maikoku Analysis	20m cells	25 m Contour Interval	Geo_f¥maikoku¥contours_maikoku_20m		Maikoku	Grid size 20 m	Geo_f¥maikoku¥dtm_20m
		50m cells	25 m Contour Interval	Geo_f¥maikoku¥contours_maikoku_50m			Grid size 50 m	Geo_f¥maikoku¥dtm_50m
		100m cells	25 m Contour Interval	Geo_f¥maikoku¥contours_maikoku_100m			Grid size 100 m	Geo_f¥maikoku¥dtm_100m
		200m cells	25 m Contour Interval	Geo_f¥maikoku¥contours_maikoku_200m			Grid size 200 m	Geo_f¥maikoku¥dtm_200m
		500m cells	25 m Contour Interval	Geo_f¥maikoku¥contours_maikoku_500m			Grid size 500 m	Geo_f¥maikoku¥dtm_500m

3. Flood Modeling

Flood Prevention Area

Major	Vector				GRID (10*10m Cell)	
	Items		Shape File Name		Polygon Shape Grid	Water Depth Grid
Flood	With Master Plan	15 Years	Flood_modeling¥Cases¥ 15 years with master plan	→	Flood_modeling¥Cases¥grids¥ 15_mp	Flood_modeling¥Cases¥wdepth¥ wd_15mp
		50 Years	Flood_modeling¥Cases¥ 50 years with master plan	→	Flood_modeling¥Cases¥grids¥ 50_mp	Flood_modeling¥Cases¥wdepth¥ wd_50mp
		Mitch	Flood_modeling¥Cases¥ mitch with master plan	→	Flood_modeling¥Cases¥grids¥ Mitch_mp	Flood_modeling¥Cases¥wdepth¥ wd_mitchmp
	With Project Priorities	10 Years	Flood_modeling¥Cases¥ 10 years with priority projects	→	Flood_modeling¥Cases¥grids¥ 10_pp	Flood_modeling¥Cases¥wdepth¥ wd_10pp
		15 Years	Flood_modeling¥Cases¥ 15 years with priority projects	→	Flood_modeling¥Cases¥grids¥ 15_pp	Flood_modeling¥Cases¥wdepth¥ wd_15pp
		50 Years	Flood_modeling¥Cases¥ 50 years with priority projects	→	Flood_modeling¥Cases¥grids¥ 50_pp	Flood_modeling¥Cases¥wdepth¥ wd_50pp
		Mitch	Flood_modeling¥Cases¥ mitch with priority projects	→	Flood_modeling¥Cases¥grids¥ Mitch_pp	Flood_modeling¥Cases¥wdepth¥ wd_mitchpp
	Without Project	5 Years	Flood_modeling¥Cases¥ 5 years without project	→	Flood_modeling¥Cases¥grids¥ 5_out	Flood_modeling¥Cases¥wdepth¥ wd_5out
		10 Years	Flood_modeling¥Cases¥ 10 years without project	→	Flood_modeling¥Cases¥grids¥ 10_out	Flood_modeling¥Cases¥wdepth¥ wd_10out
		15 Years	Flood_modeling¥Cases¥15 years without project	→	Flood_modeling¥Cases¥grids¥ 15_out	Flood_modeling¥Cases¥wdepth¥ wd_15out
		25 Years	Flood_modeling¥Cases¥25 years without project	→	Flood_modeling¥Cases¥grids¥ 25_out	Flood_modeling¥Cases¥wdepth¥ wd_25out
		50 Years	Flood_modeling¥Cases¥ 50 years without project	→	Flood_modeling¥Cases¥grids¥ 50_out	Flood_modeling¥Cases¥wdepth¥ wd_50out
		Mitch	Flood_modeling¥Cases¥ Mitch without project	→	Flood_modeling¥Cases¥grids¥ Mitch_out	Flood_modeling¥Cases¥wdepth¥ wd_mitchout
	Protection Facility for Flood		Final_data¥shapes¥proposed_rivedment_alignment		-	-

4. Watershed Management [Only for the Study Area 1:50,000]

	Vector			GRID (100*100m Cell)	
	Items	Shape File Name		Items	Grid File Name
Building of Potential Erosion Map for the Study Area	R Value (Meteorological Stations)	¥shed¥shapes¥ r_value_points	→	Interpolation	¥shed¥grids¥ r_value
	K Value (Meteorological Stations)	¥shed¥shapes¥ k_value_points	→	Interpolation	¥shed¥grids¥ k_value
	LS Value (Length & Angle of Slope)	Only Grid			¥shed¥grids¥ ls_value
	C Value (According to Land Use)	Only Grid			¥shed¥grids¥ c_value
	Sub & Micro Basin Boundaries	¥shed¥shapes¥ micro_basin_50k	→		¥shed¥grids¥ micro_basin
	Drainage System	¥shed¥shapes¥ rivers_1 & rivers_2			
	Potential Erosion	¥shed¥shapes¥ potential_erosion	→		¥shed¥grids¥ ero_ranges
	Elevation (Contour heights every 100m)	¥shed¥shapes¥ contours_100m	→	Digital Terrain Elevation Model	¥shed¥grids¥ dtm
	Slope	Only Grid			¥shed¥grids¥ slope
	Potential Erosion by Micro Basin	Only Grid			¥shed¥grids¥ micro_ero_ran
Recalculation for Possible Correction	R Value (Meteorological Stations)		→	Interpolation	¥shed¥recalc¥ r_val_1
	K Value (Meteorological Stations)		→	Interpolation	¥shed¥ recalc¥ k_val_1
	LS Value (Length & Angle of Slope)	Only Grid			¥shed¥ recalc¥ ls_val_1
	C Value (According to Land Use)	Only Grid			¥shed¥ recalc¥ c_val_1
	Potential Erosion				¥shed¥ recalc¥ eros_val_ra
	Potential Erosion by Micro Basin	Only Grid			¥shed¥ recalc¥ er_map_ton
	Land use by Micro Basin	Only Grid			¥shed¥ recalc¥ lusebyshed
	Land Use Legend Description and Statistics recalculated Excel File	¥shed¥ recalc¥ Soil losses by microbasin.xls			

5. Geodesy [Ground Field Survey 1:500]

	Vector			GRID (100*100m Cell)	
	Items	Shape File Name		Items	Grid File Name
	Lidar Elevation Model (Raw)	Only Grid			Final_data¥grids¥lidar_dem
	Lidar Elevation Model (Adjusted)	Only Grid			Final_data¥grids¥lidar_mov
Lidar and field Control Points for Contour Derivation	Bambu Zone	Geodesy¥final¥bambu_points_th+lidar			
	Reparto Zone	Geodesy¥final¥ reparto_points_th+lidar			
	Choluteca Zone	Geodesy¥final¥choluteca_points_th+lidar			
Ground Survey & Mapping Final Dataset	CAD Drawing Files	Geodesy¥final¥Ground Survey and Mapping¥ CAD files for each study zone			

6. Land Use

	Vector			GRID (10*10m Cell)	
	Items	Shape File Name		Items	Grid File Name
Existing Land Use	Land Use Plan (PAST:1986) (Wide:20000 square km) Study Area	Land_use_tanaka¥studya¥land_use_study86			Land_use_tanaka¥studya¥luse84
	Updated Land Use 2001 Study Area	Only Grid			Land_use_tanaka¥studya¥luse01
	Land Use Residential Planning Target Area		←	Land Use Residential Planning Target Area	Land_use_tanaka¥colonia¥luse_pre2
	Categories used in land use residential planning	Only Grid Data Sets Format	←	Categories used in land use residential planning: Commercial, Business & Protocol, Public facilities, Sports Fields, Airport & Military Areas, Park & Cemetery, Residential Settlements, Forest & Shrubs, Industrial, Reservoir, Road Network, River Reserve Area.	Land_use_tanaka¥colonia¥ Comm_cbd, pub_fac, airp_milit, water, parks, sports, cemetery, industrial, settle, forest, roads, river_re Grid data sets used in the preparation of land use for target area.
	Colonia Boundaries (Residential classes)	Land_use_tanaka¥colonia¥colonia_rev_15nov		Colonia Boundaries (Residential classes)	Land_use_tanaka¥colonia¥colo1
	Built up Areas	Land_use_tanaka¥colonia¥builtup_rev_15nov		Built up Areas	Land_use_tanaka¥colonia¥built_up
	Colonia + Built up areas			Colonia + Built up areas	Land_use_tanaka¥colonia¥colo_built
	Historical District	Final_data¥shapes¥historic_district			
	River Reserve Areas (Buffering)	Final_data¥shapes¥ river_reserve_area.			
	Total Drainage Basin Systems	Land_use_tanaka¥studya¥Micro_basin_50k			Land_use_tanaka¥studya¥Micro_bas
Future Land Use 2015	Land Use Plan Study Area				Land_use_tanaka¥studya¥luse20
	Land Use Residential Planning Target Area				Land_use_tanaka¥colonia¥future¥futu_luse4
	Future Housing Development	Land_use_tanaka¥colonia¥future¥urbanizaciones nuevas			
Regulation Zoning	Flood Control Regulation Zoning Mitch with Master Plan and Priority Projects				Land_use_tanaka¥Regulation_Zoning¥Flood¥Grid data sets Mitch_mp, Mitch_pp
	Landslide & Slope Failure Regulation Zoning				Land_use_tanaka¥Regulation_Zoning¥Landslides_Slope_Failure¥Grid data sets Zone_1, Zone_2

7. Other Data(Images , Excel etc)

	Items	File Name			
Image	2001 Orthophoto images (0.4 m pixel) (Original Data)	Orthophotos¥ Tiff Files Data Sets by each orthophoto			
Image	2001 Orthophoto images (1.0 m pixel) (resampling)	Geo Images¥Mosaico.img Img Files Data Sets by each orthophoto			
Image	Study Area Topo Maps (Cartographic Maps from IGN)	Geo Images¥ hoja_carto_1628 Geo Images¥ hoja_carto_1636			
Image	Aerial Photographs, Tegucigalpa Area Georeferenced	Aerial_photography¥photo_1946.img Aerial_photography¥photo_1954.img			
Image	Aerial Photographs, Tegucigalpa Area (Open Skies 1999 USGS) Not Georeferenced	Aerial_photography¥flight_line1 Aerial_photography¥flight_line4			
DGN, DWG	Aerocarta Digital Mapping 1:5000, 1:10,000 scales	Digital_Mapping¥June_8_Edition¥10000 Digital_Mapping¥June_8_Edition¥5000¥DGN Digital_Mapping¥June_8_Edition¥5000¥DWG			
DWG	Drainage and Water Supply from SANNA	Final_data¥shapes¥drain.dwg			
	Mitch Flood Survey (TH)	Final_data¥shapes¥th_mitch_flood_survey			