ANNEX I　リスクベース保険料率算定ツール及びGIS 基礎研修結果

リスクベース保険料算定ツール及び GIS 基礎研修結果

　2016 年 11 月 17 日〜18 日にかけて、GSIS の関係職員に対して、「リスクベース保険料算定ツール、及び QGIS に係る基礎研修」を実施したので、下記のとおり報告する。

1. 目的
本研修実施の主たる目的は、以下のとおりであった。
　　(1) GIS を用いたリスクベース保険料算定ツールの操作技術の取得
　　(2) GSI の基礎知識及び QGIS の基礎技術の習得

2. 研修生
　本研修生は、GSIS から 20 名が出席した。出席した研修生は、下表に示すとおりである。

No.	Name	Office
1	Rafael Anthony C. Oñate III	Marketing Department
2	Marvin Cris A. Concepcion	Marketing Department
3	Tristan P. Hernandez	Marketing Department
4	Filipina A. Borreta	Marketing Department
5	Sheila Rivera	Underwriting Department
6	Michael Antonio Guillermo	Underwriting Department
7	Joseph Arne Delos Reyes	Underwriting Department
8	Patricio Bonagua	Underwriting Department
9	Bernard Christian Untalan	Underwriting Department
10	Evelyn C. Santos	Claims Department
11	Albert Paul Dela Merced	Claims Department
12	Emily B. Besid	GIAD
13	Bernadette R. Rodriguez	FMAD
14	Elma S. Aggarao	Controller Group
15	Carlito C. Ordoñez	ITSG
16	Jocelyn G. Sande	IASO
17	Roselle S. Manejero	IASO
18	Homer E. Mabagos	ISO
19	Marcelina C. Natividad	RMO
20	Eugen O. David	MUCO-IG

- GIAD: General Insurance Accounting Department

- FMAD: Financial Management Accounting Department

- OSVP-FMMSU : Office of the Senior Vice President, Financial Reporting and Monitoring Support Unit

- ITSG: Information Technology Service Group

- IASO: Internal Audit Service Office

- ISO: Information Security Office

- RMO: Risk Management Office

- OVP-IG: Office of the Vice President, Insurance Group

3．研修内容

本研修は 2 日間実施した。それぞれの研修内容は次のとおりである。

(1) 1 日目（11/17、午前 9 時～午後 12 時、午後 1 時半～午後 4 時半）

> プロジェクト概要に関する説明

> リスクベース保険料算出ツールに関する概要説明

> GIS の基礎に関する講義

> QGIS 及び保険料算出ツールのインストール作業

> 保険料算出ツールに操作に関する実習

> QGIS を利用した地図座標変換に関する実習

> QGIS を利用した GIS データ表示に関する実習

(2) 2 日目（11/18、午前 9 時～午後 12 時、午後 1 時半～午後 4 時半）

> QGIS を利用したマップレイアウトに関する実習

> QGIS を利用した属性テーブル編集に関する実習

> QGIS を利用した空間解析に関する実習

4．研修結果

(1) リスクベース保険料算出ツールに関する概要説明

第 1 回 JCM で利用したツールの概要説明資料を元に、ツールには自然災害の強度データ(例えば地震であれば PGA、台風であれば風速)と財物の脆弱性カーブが格納されており、ツールを利用することで超過確率ごとの想定損害額や保険料率を算出できることを説明した。本講義に使用したテキストは、巻末資料 1 に添付する。

(2) リスクベース保険料算出ツールの操作に関する実技

研修参加者全員に対してリスクベース保険料算出ツールの DVD を配布し、画面を見ながらツールのインストールを一緒に行った。GSIS が用意した PC のうち、依頼していた仕様を満たしていない場合にインストールが上手くできなかった場合もあったが、その他の PC では全員がツールのインストールに成功した。さらに、ツールを利用して仮想の Exposure で保険料率を算出する実習を行い、参加者はツールの利用方法を理解することができた。

(3) GIS の基礎に関する講義

GIS の基礎講義では、GIS を扱う上で最低限知っておくべき事項に焦点をあて、①GIS とは、②データ形式について、③地図座標系について、④GIS の代表的な機能について説明し、その後、本研修で使用する QGIS フリーウェアについて紹介した。本講義に使用したテキストは、巻末資料 2 に添付する。
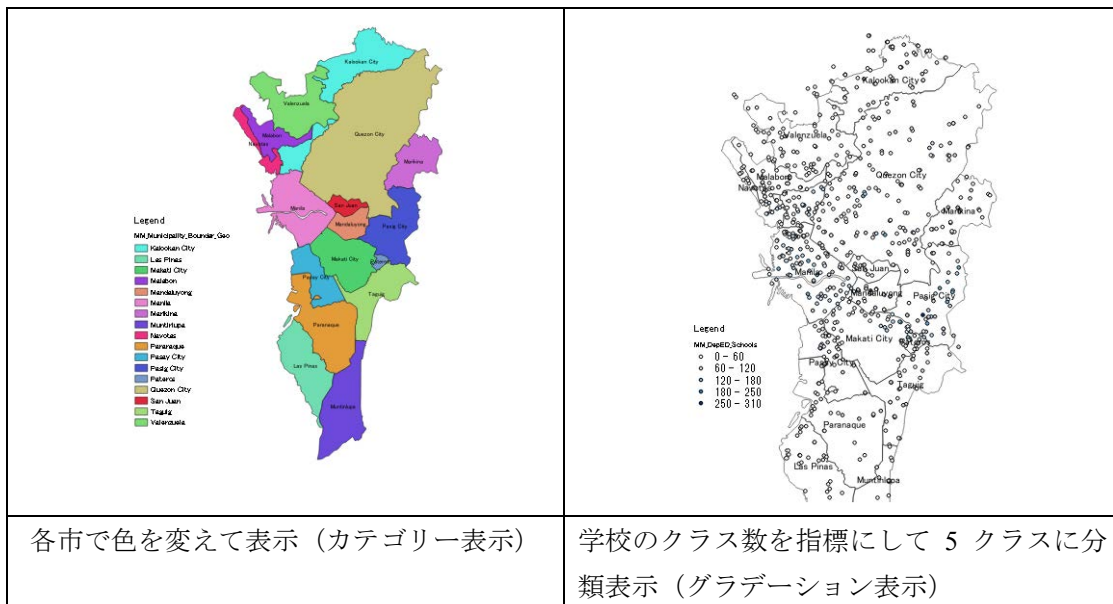
(4) QGIS に関する実習

QGIS の実習では、用意した QGIS ソフトウェア及びマニュアルを用いて、以下の 5 つのトピックついて、本プロジェクトで使用している GIS データを活用しながら、様々な GIS 解析を実施した。本研修で使用した QGIS マニュアルは、巻末資料 3 に添付する。

(a) 地図座標変換

GIS 上では、緯度経度単位の座標とメートル単位の XY 直行座標系が存在し、両者は一緒に GIS 上で解析に使用することができないため、どちらかの座標に統一する必要がある。そのため、本研修では基本的な重要事項の 1 つとして、座標系変換についての実習を行った。これにより、研修生は緯度経度座標系から XY 直行座標系へ、あるいはその逆の変換が可能となった。

(b) GIS データ表示

GIS データを表示させるためには、いくつかの表示方法を覚える必要があるため、本研修では、一番基本的なカテゴリー表示とグラデーション表示についての実習を行った。この手法をマスターすることで、研修生らは以下のような GIS データの表示が可能となった。


| 各市で色を変えて表示（カテゴリー表示） | 学校のクラス数を指標にして 5 クラスに分類表示（グラデーション表示） |

(c) マップレイアウト

　マップレイアウトは、GISデータを表示させ、地図要素（タイトル、方位、凡例、スケールバー、座標など）を追加させるための機能であり、この技術を習得することで、簡単に各種主題図を作成することができる、その成果は報告書や大きなサイズの図面を作成するときに活用される。したがって、本実習においても研修生らが簡単に整飾された地図を作成できるよう指導した。次図は、マップレイアウトを活用して研修生が作成した図面である。

Map of Ground Shaking with DepED Schools in Pasay

| パサイ市の地盤振動マップ上に DepED の学校を表示させ、マップ要素を加えた地図 |

(d) 属性テーブルの編集

　GISデータの属性情報を更新する上では、属性テーブル編集の技術は非常に重要となる。したがって、本研修では属性テーブル編集の基礎なる①既存テーブル情報の削除、②新規属性テーブルの追加、③ポリゴン面積、ライン長さの計算、⑤新規インデックスの計算方法、⑥エクセル用データへの変換に係る実習を行った。

(e) 空間解析

　GISの一番の特徴は、この空間解析機能であり、複数のGISデータを用いて、目的とする新たなGISデータを作成することが可能となる。そのため、本研修ではGISで頻繁に使用

される機能（クリッピング、バッファーリング、インターセクト）についての実習を行った。

A) クリッピング

クリッピングとは、例えば、メトロマニラ圏に部分している学校データから、ケソン市、マカティー市など、特定のエリアの学校データのみを抽出する機能である。本研修は、最初にこのクリッピング空間解析機能を説明実習を行った。先に示した図は、パサイ市を対象にしたもので、パサイ市の地盤振動データと学校データを抽出して作成したものである。

B) バッファーリング

バッファーリング機能は、ポイントデータ、あるいはラインデータから一定の距離の領域を発生させる機能である。例えば、学校から半径5km以内の領域、断層から2km以内の領域などである。本研修では、断層データを活用して、断層から1km、及び2kmの範囲を求め、さらに前述のクリッピング機能を活用して、それぞれの範囲に属する学校データを作成する実習を行った。
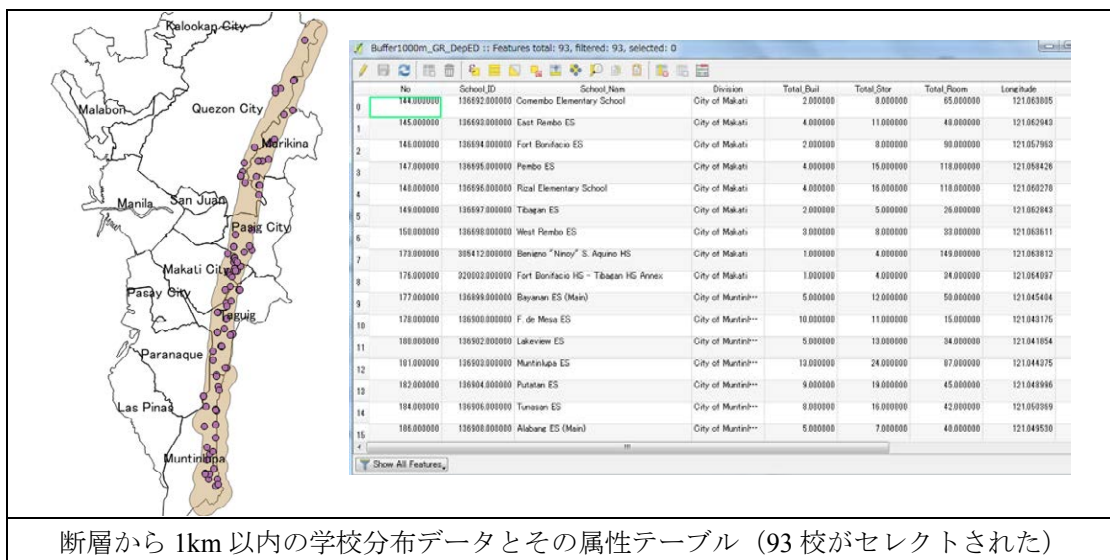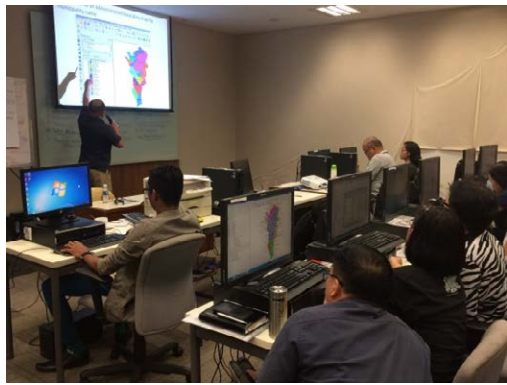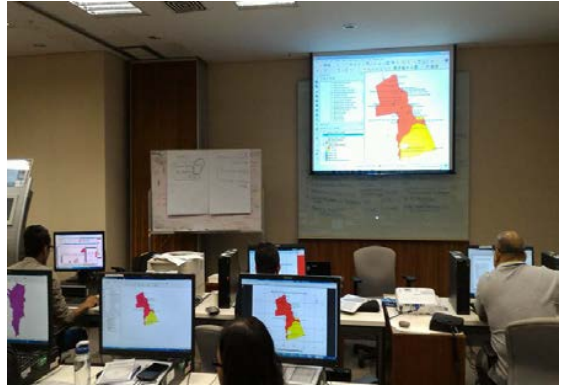

断層から1km以内の学校分布データとその属性テーブル（93校がセレクトされた）

C) インターセクト

インターセクトとは、GISの中で2つの条件の重なるエリアを求める機能である。例えば、2つの種類のハザードデータがあり、その両方の危険エリアを求める際に利用したりする。本研修では、地盤振動と液状化のハザードデータを利用し、最も地盤が振動するエリア、且つ液状化のポテンシャルが最も高いエリアを抽出する実習を行った。
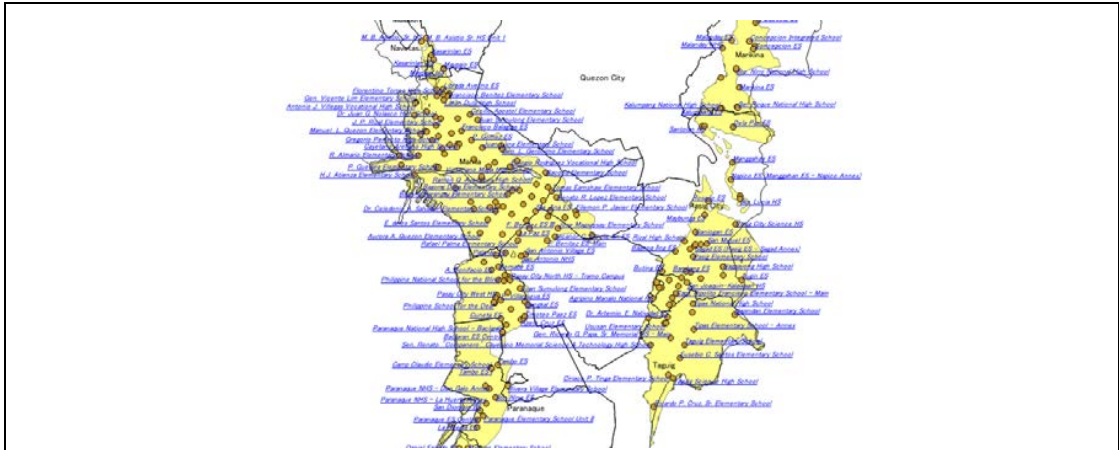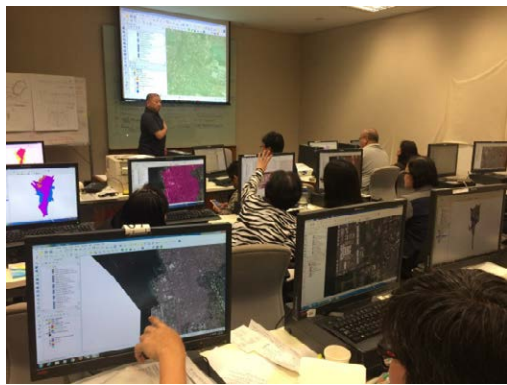
インターセクトで抽出されたエリア（黄色）とそのエリアの学校データ

GIS データ表示に関する実習	空間解析に関する実習
画像データのハンドリングの実習	マップレイアウトに関する実習

　以上の実習を通じて、研修生らは GIS の基本機能を理解し、目的にあったデータ、図面などを作成できるスキルを身に着けたが、引き続き、GIS のトレーニングが必要である。

5. 研修評価

　今回の研修内容を評価するため、巻末資料 4 に添付した質問票を研修後に研修生に配布し回答してもらった。また、巻末資料 5 には、研修生からの回答してもらった質問票を添付する。質問票の回答によれば、今回の GIS 基礎研修に関する評価は以下のとおりである。

- 研修参加者の半分程度は、今回の GIS 基礎技術を 75%以上は理解できた。
- 一方、研修参加者の半分程度は、GIS 基礎技術の 50%程度の理解であった。
- また、今回の GIS 基礎研修を通じて、GIS は非常に役に立つツールであることが理解できた。
- 空間解析機能に係る実習をもう少し実施した方がよかった。
- データ収集に関する研修が必要である。
- 今回の GIS 基礎研修内容とリスクベール保険料算定ツールとの相互関係がよく理解できなかった。
- 今後も継続的な研修が必要である。

　以上のことから、第一回目の GIS 基礎研修としては、ある程度の成果を出せたのではないかと考えられる。今後は、この質問票の結果を考慮し、より効果的な研修生らの業務に適応した研修内容を検討する必要があろう。

6. 提言

　今回の研修を通じて、GSIS 側も今後の GIS の必要性を強く感じており、GSIS への本格的な GIS の導入について、以下のように提言する。

　一般的には、GIS を導入する際には、次の 3 つの点が鍵となり、このどれかが不足すると GIS の導入は失敗に終わるケースがある。

　① GIS 業務を実施していく体制の確立 (Organizational Issue)
　② 年間予算の確保 (Financial Issue)
　③ 人材の育成および確保 (Human Resource Issue)

(1) GIS 業務を実施するための体制の確立 (Organizational Issue)

　通常、GIS 業務は片手間にできる作業ではなく、それ自体でかなりのボリュームを要する業務である。例えば、新規データの作成、既存データの修正、属性テーブルの編集作業など、多岐に渡る。また、本プロジェクトを通じて、GSIS には GIS データ化していくべき情報が大量にあることが確認されている。

したがって、GSIS に本格的な GIS を導入するには、専属のユニット (GIS Unit) の設立が必要であり、このユニットの中で全ての GIS データを管理、構築していかなければならない。例えば、既存の部門の中でそれぞれ GIS ユニットを設立すると、それぞれの場所で勝手に GIS データが構築、編集され、複数の似たようなデータが構築される可能性も高く、データの品質管理ができなくなる。一方、専属の部署が設立されれば、その中で GIS データベースは一元管理され、あるフォーマットに準じた GIS データベースを構築していくことが可能となる。また、専属部署の場合は、基本的に GIS 作業以外の作業が生じないため、職員も作業に集中できるようになるメリットがある。

(2) 年間予算の確保 (Financial Issue)

本プロジェクトでは、フリーウェアである QGIS を活用しリスクベース保険料算出ツールを開発し、その研修を実施した。仮に GSIS に本格的な GIS を導入する場合、OM 費用がかからない QGIS を導入すれば、すくなくとも GIS に関する費用を考慮する必要はない。しかし、本格的な GIS 導入では、ハイスペックな PC、データを管理していくためのデータベースサーバー、大型図面を出力するためのプロッターやプリンター、それに付随するインク、紙など、様々なハードウェアが必要となってくる。
したがって、GIS を導入する際には、年間にかかるコストを算出し、それを毎年確保していく必要が生じてくる。もし、この年間のランニングコストを確保出来ない場合は、継続して GIS を利用していくことが難しくなってくる可能性が高い。

(3) 人材の育成および確保 (Human Resource Issue)

GIS を日々の業務の中で利用して上で一番重要なのが、GIS を適切に操作できる人材を如何に確保するかである。例えば、GIS スキルを持った人材を雇用する、あるいは、GIS ユニットに配属された職員への GIS 研修を実施していくなどがある。また、人材の中には、大きくアドミニストレーターの立場の人材とオペレーションの立場の人材が必要になってくる。したがって、人材育成では以下のような事を検討していかなければならない。

➢ 外部講師によるアドミニストレーター育成のための研修
➢ 外部講師及びアドミニストレーターによるオペレーター育成のための研修
➢ 外部講師及びアドミニストレーターによるツール開発のためのプログラム研修
➢ 各種 GIS 研修のためのカリキュラムの開発
➢ 年間の研修スケジュール計画の作成

このような研修計画を立案、実施していくことにより、GIS ユニットのアドミニストレー

ター、オペレーターを育成しながら、日々の GIS 業務への対応を可能にしていく。

　以上のとおり、GSIS が GIS を導入するには、上記の 3 つ点を検討し、GIS ユニットの設立を目指していくことが望ましい。そのためには、まずは JICA の技術協力プロジェクなどを通じて、GSIS の GIS に関する専門性を高めていくことが重要であろう。
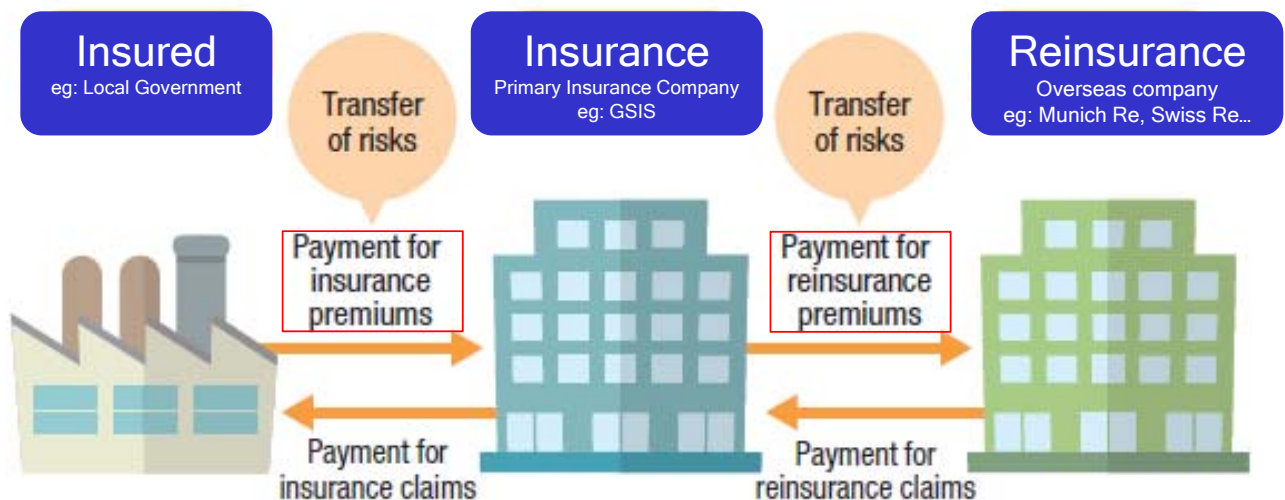
巻末資料1： リスクベース保険料算出ツール講義テキスト

Development of risk-based insurance premium calculation tool
for Metro Manila

November 16th, 2016

What is insurance?

Insurance is one of the traditional risk transfer methods. Re/insurance companies underwrite an insured's Risks and determine insurance premium.

Re/Insurance companies need to collect adequate insurance premiums for adequate insurance payment

→How to calculate adequate premium?

| Insured
eg: Local Government | Transfer of risks | Insurance
Primary Insurance Company
eg: GSIS | Transfer of risks | Reinsurance
Overseas company
eg: Munich Re, Swiss Re… |

Payment for insurance premiums

Payment for reinsurance premiums

Payment for insurance claims

Payment for reinsurance claims

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How to get adequate premium?

Re/Insurance company need to understand the risk for each insurance product monetary base.

➢ Statistics Pricing

If Re/Insurance company have a lot of insurance loss data, they can understand the risk using statistic approach. Statistic Loss Analysis can show us the annual average Loss and volatility by each insurance product.

eg: Motor insurance, Fire insurance….

➢ Model based Pricing

Statistical approach cannot take into account "Low-frequency High-severity Catastrophe''. Major Re/Insurance company use Natural Catastrophe model based on science and engineering.

eg: Property insurance

What is Catastrophe Model?

What is Catastrophe Model?
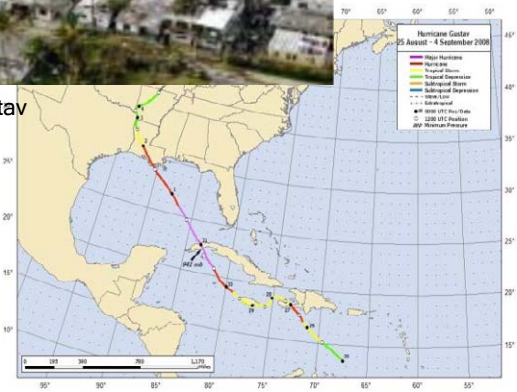
Catastrophe(Cat) Model:
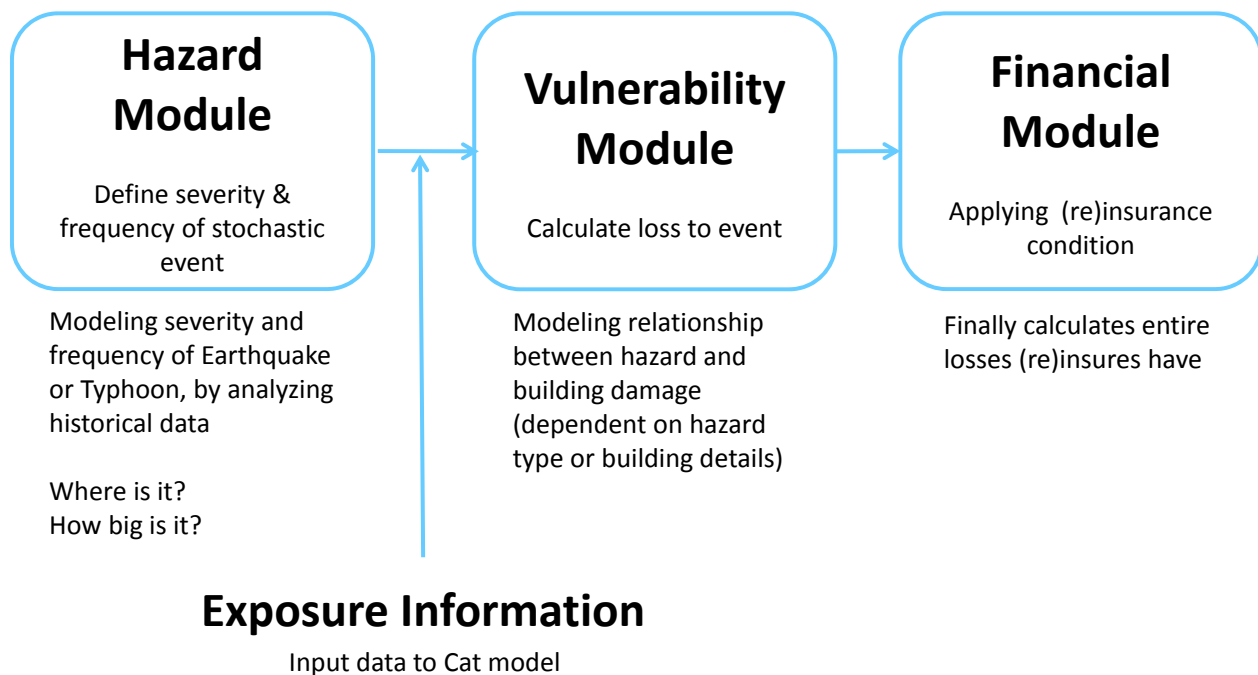- To determine potential losses from natural disaster
- Probabilistic approach

Sichuan Earthquake

Hurricane Gustav

4

CAT Model Framework

Hazard Module	**Vulnerability Module**	**Financial Module**
Define severity & frequency of stochastic event	Calculate loss to event	Applying (re)insurance condition

Modeling severity and frequency of Earthquake or Typhoon, by analyzing historical data

Where is it?
How big is it?

Modeling relationship between hazard and building damage (dependent on hazard type or building details)

Finally calculates entire losses (re)insures have

Exposure Information

Input data to Cat model

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5

Outline of NatCat Model

Typhoon events	Hazard Severity	Loss Estimation

Generation / Track module

How many typhoons occur?
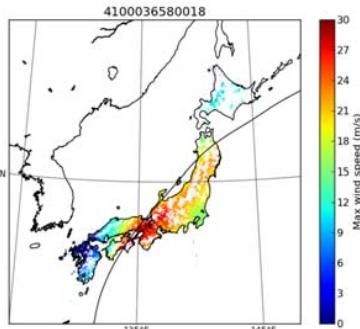Where does a typhoon occur?
Which direction does the typhoon step?
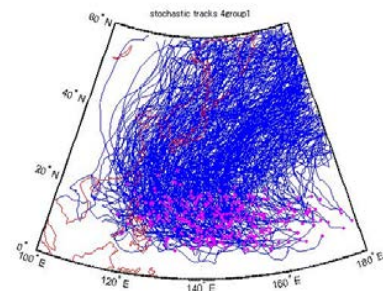
・Genesis model
・Track model

Wind speed evaluation module

What is a wind speed on a certain site?

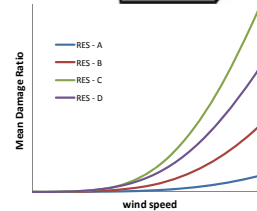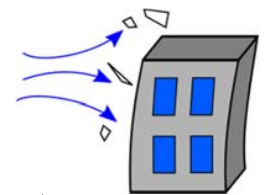・Pressure model
・Gradient wind model
・Surface wind model
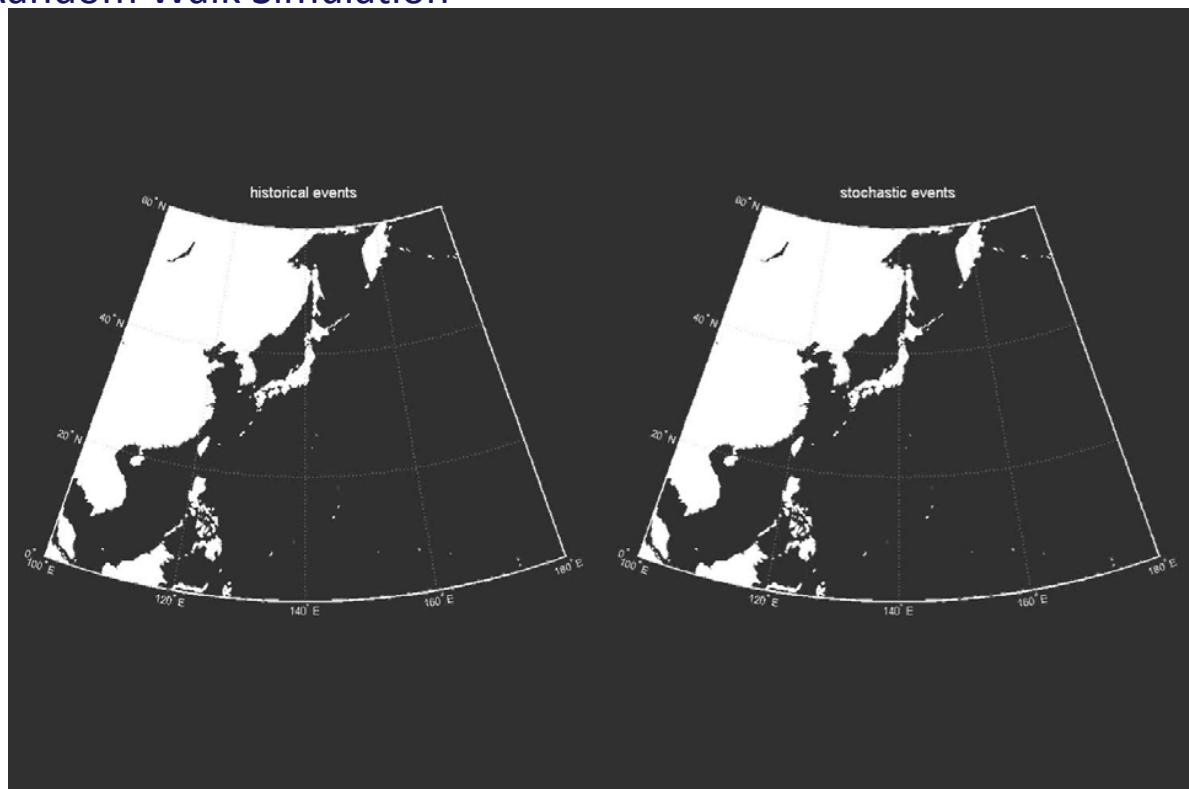
Vulnerability module

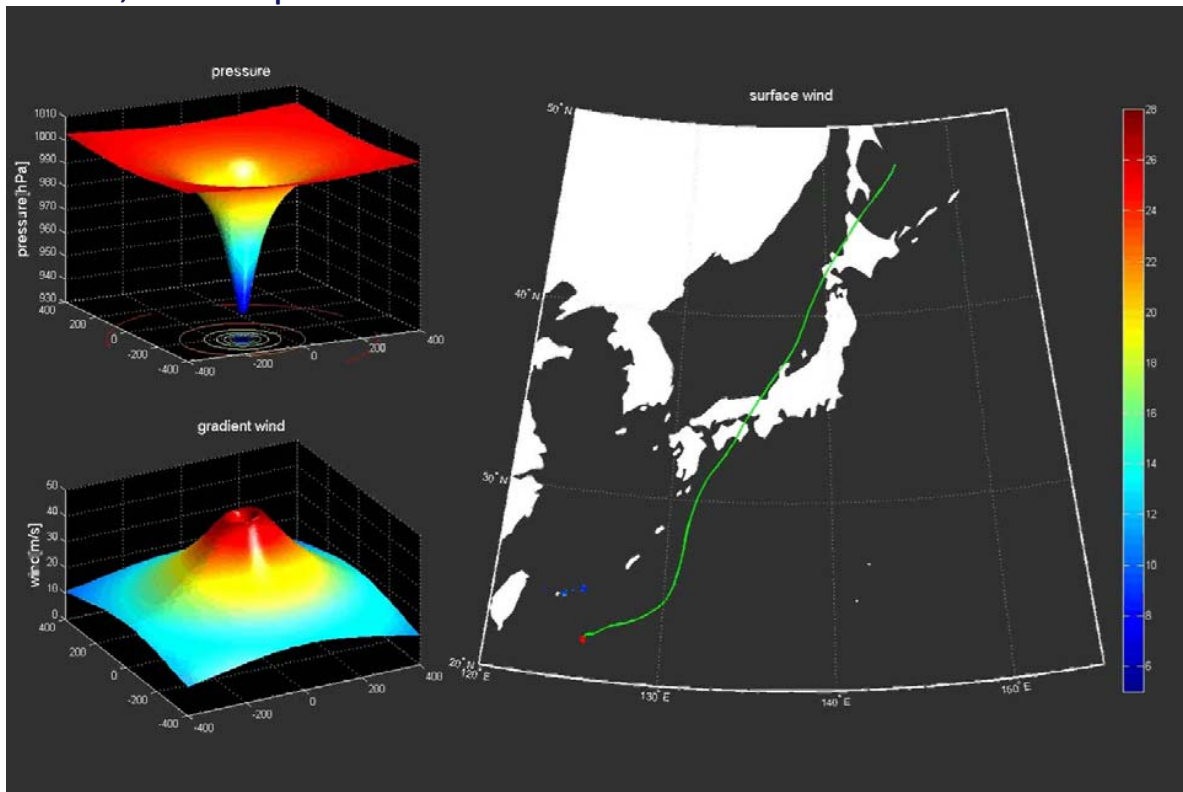What is the damage level and loss amount due to a typhoon?

・Vulnerability model

Typhoon modeling

Random Walk Simulation
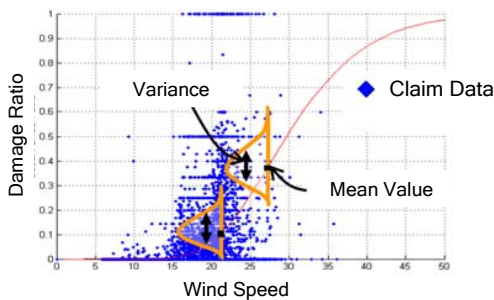
I-14

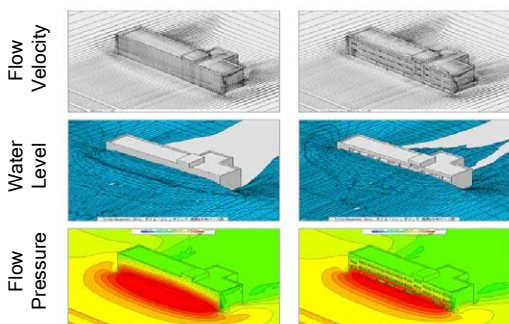# Typhoon modeling

Pressure, Wind Speed Simulation

Vulnerability Module

Statistical Approach

Engineering Approach

Vulnerability Curve

Example: Damage ratio – Wind Speed relationship
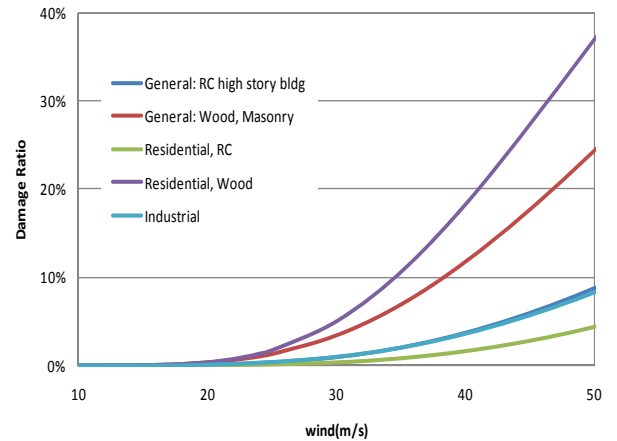
- General: RC high story bldg
- General: Wood, Masonry
- Residential, RC
- Residential, Wood
- Industrial

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Modeling Input and Output

Input: Exposure information
- Geographic location (spatial distribution of contract; state, county…)
- Insured Value by Coverage (Bldg, Cont, BI) and by Location
- Attributes (Construction, Year Built, Height of Bldg, Occupancy, ….)
- Financial Information (Deductibles, Limits, Reinsurance scheme, ….)

Exposure data input

Modelled Loss is calculated by each event

Accumulation ▭ High

Event 5

Event 1　Event 2　Event 3　　　　Event 4

Event Loss Table (ELT)
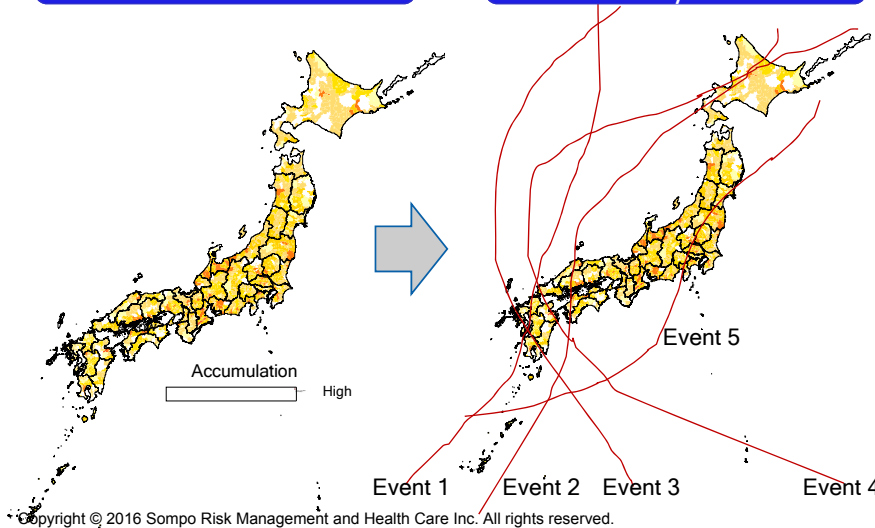
Event ID	Freq.	Mean Loss	Standard Deviation
1	0.00050	1,000,000	1,005,000
2	0.00250	500,000	170,000
3	0.00020	2,000,000	1,365,000
4	0.00015	3,000,000	1,875,000
5	0.00010	5,000,000	2,085,000
6	…	…	…
7	…	…	…

Modeling Input and Output –statistics-

Exceedance Probability curve (EP curve) can be generated by arranging Event Loss Table in descending order. Re/Insurance company use EP Curve for their Risk accumulation control.

Exceedance Probability Curve

Exceedance Probability (y-axis: 0% to 100%)
Loss (x-axis)

1 in 5 year loss

1 in 10 year loss

1 in 100 year loss　1 in 200 year loss

(**)Value at Risk is defined as the threshold value such that the probability that the loss over the given time horizon exceeds this value.

Value at Risk Table

Return Period(Year)	VaR(PHP)
10000	500,000,000
5000	450,000,000
1000	300,000,000
500	250,000,000
250	190,000,000
200	160,000,000
100	120,000,000
50	95,000,000
20	55,000,000
10	35,000,000
pure premium	**14,000,000**
Standard Deviation	**30,000,000**

(*) Return period: 1/exceedance probability

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Catastrophe Pricing Model

JICA study team develops Proto type pricing model based on NatCat Risks
Target Region : Metro Manila
Target Perils : Earthquake, Typhoon, Flood, Storm Surge, Tsunami,
                Landslide, Liquefactions

Source Data

Hazard : AIR, Air World Wide, Provided Earthquake, Wind, Tsunami,
Storm Surge Data.   UP is developing Flood Hazard map
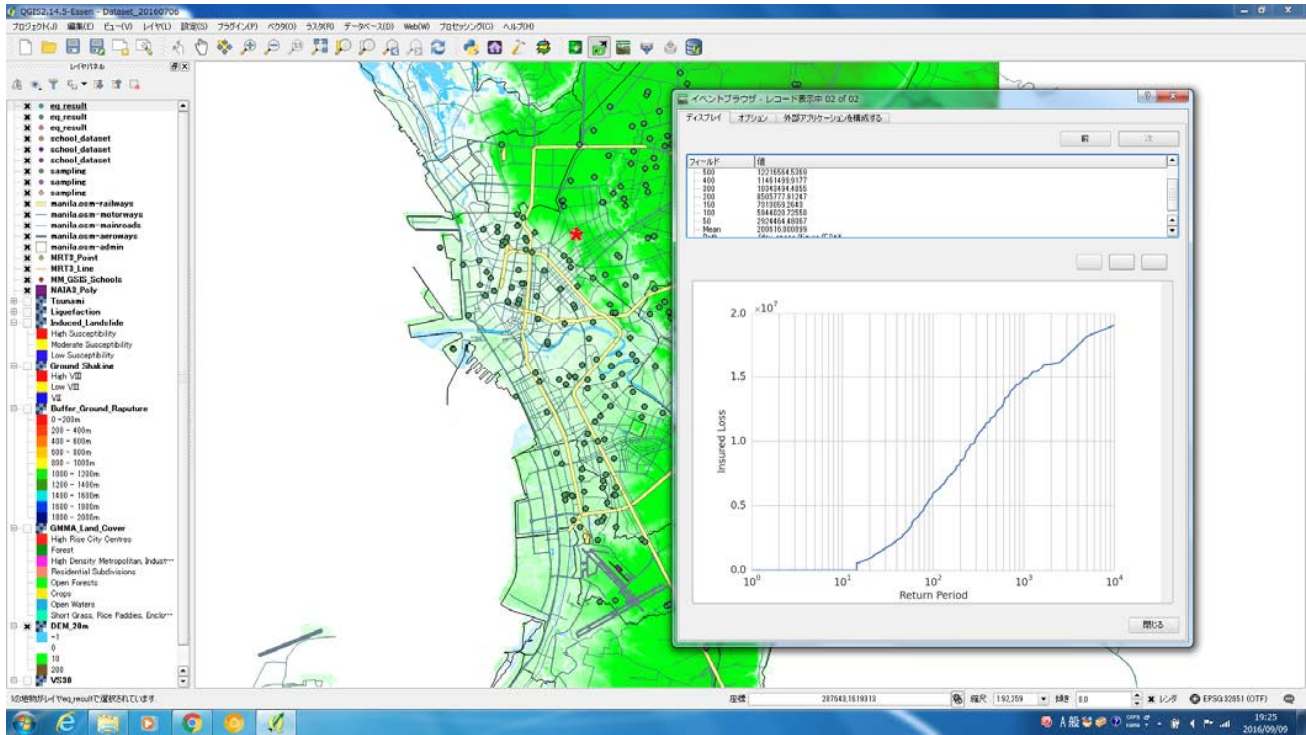
Vulnerability: UP provided Vulnerability curve

Exposure: School (Location, Sum Insured: GSIS)
          MRT3 (MRT3)
          AirPort Terminal 3 (NAIA)

Earthquake Hazard

Concrete Building Types

Vulnerability curve

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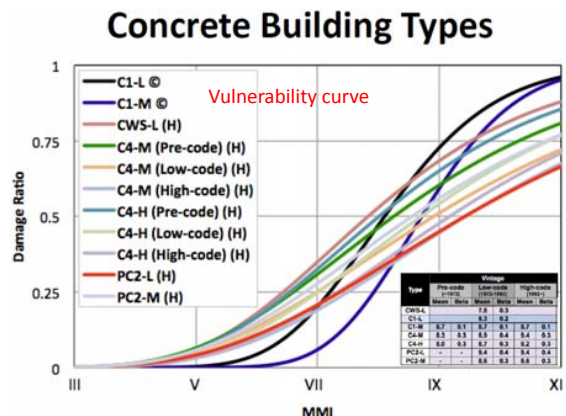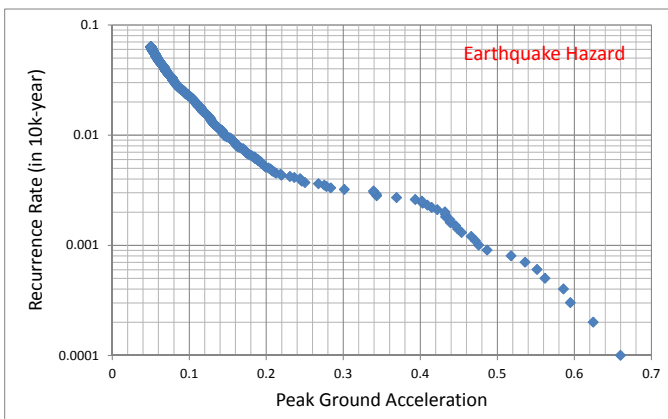
Platform

GIS(Geographic information system)

Pricing Results

Construction Reinforced Concrete
Year built: 1972-1992   story: 3-7

School ID	Replacement Cost	Annual Average Loss(php)	Premium Rate	Return Period(Year)(php)								
				1000	500	250	200	100	50	25	20	10
S1	11,040,000	74,907	0.679%	5,686,909	5,167,238	3,610,065	2,902,781	1,805,372	929,286	373,250	263,458	87,224
S2	3,680,000	36,381	0.989%	1,822,060	1,568,622	1,284,975	1,171,298	865,498	469,058	231,877	165,454	59,162
S3	31,100,000	316,361	1.017%	15,444,213	13,290,439	10,928,624	10,027,877	7,431,908	4,074,186	2,042,290	1,456,704	530,655
S4	29,600,000	268,336	0.907%	14,122,126	12,066,893	9,794,891	9,113,202	6,634,145	3,475,124	1,683,467	1,187,204	408,238
S5	3,800,000	33,719	0.887%	1,843,973	1,566,134	1,261,611	1,153,564	838,428	437,481	208,127	148,477	49,645
S6	7,000,000	64,357	0.919%	3,542,170	3,084,852	2,400,128	2,129,152	1,561,851	821,489	384,010	276,783	97,139
S7	8,700,000	78,825	0.906%	4,426,151	3,853,100	3,039,305	2,651,410	1,928,498	1,002,895	463,968	334,094	114,612
S8	29,000,000	267,120	0.921%	14,608,475	12,593,087	10,084,146	8,851,147	6,528,301	3,441,292	1,614,397	1,156,689	396,280
S9	4,750,000	43,171	0.909%	2,408,386	2,099,055	1,659,203	1,445,403	1,053,938	549,929	256,272	185,010	63,497
S10	13,500,000	112,091	0.830%	6,859,363	5,934,289	4,480,356	3,992,107	2,821,391	1,418,087	643,697	449,921	150,387
S11	2,750,000	22,213	0.808%	1,375,757	1,207,166	883,419	799,644	563,646	279,950	124,675	86,611	29,592
S12	62,462,278	508,458	0.814%	31,167,343	27,380,234	20,021,365	18,206,329	12,731,603	6,432,452	2,882,446	2,008,495	690,691
S13	15,459,640	127,105	0.822%	7,863,430	6,804,552	5,181,038	4,554,683	3,230,633	1,585,875	726,114	507,217	167,247
S14	8,000,000	69,826	0.873%	3,983,848	3,495,133	2,657,843	2,393,063	1,710,916	896,764	411,166	296,782	102,003
S15	29,110,000	240,720	0.827%	14,444,726	12,707,374	9,365,896	8,523,384	5,937,559	3,059,545	1,389,373	989,214	339,756
S16	41,261,000	355,491	0.862%	20,403,566	17,960,392	13,601,515	12,275,933	8,775,173	4,583,673	2,080,504	1,505,240	517,854
S17	67,925,367	570,728	0.840%	33,486,000	29,488,815	22,002,589	19,884,439	13,969,471	7,276,410	3,344,741	2,358,285	834,150
S18	63,755,247	489,258	0.767%	32,012,966	28,120,408	20,279,647	17,929,379	12,112,536	6,111,011	2,669,254	1,843,610	633,719
S19	58,236,426	391,884	0.673%	29,306,740	25,745,396	17,564,190	15,131,144	10,204,623	4,674,104	1,957,013	1,309,823	423,377
S20	54,250,000	390,827	0.720%	27,356,314	24,009,185	17,072,447	14,766,421	9,879,209	4,814,063	2,031,377	1,381,215	466,458
S21	59,300,000	472,993	0.798%	29,652,915	26,069,502	18,922,600	17,031,780	11,674,817	6,007,729	2,669,414	1,848,462	641,415
S22	72,588,435	669,324	0.922%	42,009,658	40,010,324	26,234,062	22,451,647	13,972,336	8,416,034	3,591,947	2,715,162	1,128,335
S23	100,234,453	678,834	0.677%	53,184,648	49,631,945	31,554,946	25,970,747	15,440,132	8,369,144	3,115,891	2,320,224	831,596
S24	122,000,000	699,837	0.574%	59,077,154	55,239,514	33,257,302	28,031,539	16,082,731	8,564,061	3,058,009	2,238,200	767,409
S25	87,244,574	534,625	0.613%	43,060,131	39,809,333	25,060,032	21,128,295	12,462,680	6,430,357	2,449,085	1,789,412	613,966
S26	80,158,228	563,107	0.702%	43,260,646	40,337,814	25,894,326	21,279,951	12,885,518	6,993,168	2,616,847	1,964,475	705,633

Premium Rate(EQ) =EQ Annual average Loss / Replacement Cost

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Insurance Premium Incentive

After the school's retrofit work, Pure Premium will be decreased by approximately 40%.

Construction Reinforced Concrete
Year built: 1972-1992   story: 3-7

Year built 1992-

| School ID	Replacement Cost	Before Retrofit Annual Average Loss(php)	Premium Rate	After Retrofit Annual Average Loss(php)	Premium Rate	Insurance Premium Incentive(php) Before- After	%Decrease (Before- After)/ /Before
S1	11,040,000	74,907	0.679%	46,366	0.420%	28,541	38.1%
S2	3,680,000	36,381	0.989%	22,425	0.609%	13,956	38.4%
S3	31,100,000	316,361	1.017%	195,087	0.627%	121,274	38.3%
S4	29,600,000	268,336	0.907%	164,784	0.557%	103,552	38.6%
S5	3,800,000	33,719	0.887%	20,728	0.545%	12,991	38.5%
S6	7,000,000	64,357	0.919%	39,686	0.567%	24,670	38.3%
S7	8,700,000	78,825	0.906%	48,663	0.559%	30,162	38.3%
S8	29,000,000	267,120	0.921%	164,761	0.568%	102,359	38.3%
S9	4,750,000	43,171	0.909%	26,640	0.561%	16,531	38.3%
S10	13,500,000	112,091	0.830%	69,100	0.512%	42,990	38.4%
S11	2,750,000	22,213	0.808%	13,681	0.497%	8,532	38.4%
S12	62,462,278	508,458	0.814%	312,972	0.501%	195,486	38.4%
S13	15,459,640	127,105	0.822%	78,396	0.507%	48,709	38.3%
S14	8,000,000	69,826	0.873%	42,981	0.537%	26,846	38.4%
S15	29,110,000	240,720	0.827%	147,975	0.508%	92,745	38.5%
S16	41,261,000	355,491	0.862%	218,629	0.530%	136,862	38.5%
S17	67,925,367	570,728	0.840%	350,471	0.516%	220,257	38.6%
S18	63,755,247	489,258	0.767%	301,006	0.472%	188,252	38.5%
S19	58,236,426	391,884	0.673%	241,522	0.415%	150,362	38.4%
S20	54,250,000	390,827	0.720%	240,773	0.444%	150,054	38.4%
S21	59,300,000	472,993	0.798%	290,902	0.491%	182,091	38.5%
S22	72,588,435	669,324	0.922%	417,179	0.575%	252,146	37.7%
S23	100,234,453	678,834	0.677%	421,245	0.420%	257,589	37.9%
S24	122,000,000	699,837	0.574%	429,222	0.352%	270,615	38.7%
S25	87,244,574	534,625	0.613%	328,586	0.377%	206,039	38.5%
S26	80,158,228	563,107	0.702%	350,321	0.437%	212,786	37.8%

Pricing Results - All Stochastic EQ Event (Averaged View)-

Right Figure shows the EQ Rate on the map drawn by calculation tool's results. EQ premium rate consistent with PHIVOLCS's hazard map.

Low EQ Rate Area
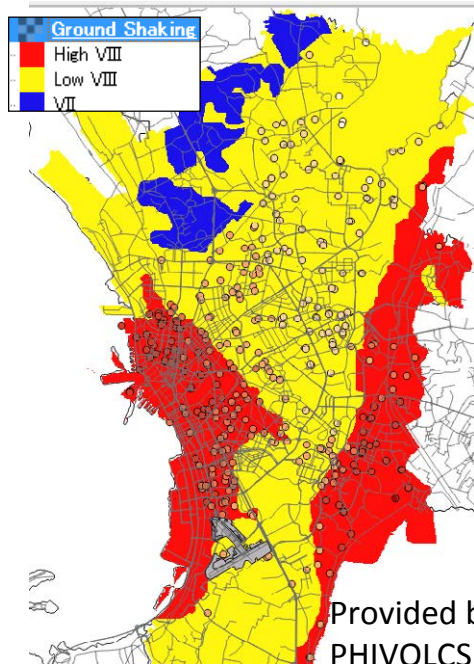
Provided by PHIVOLCS

High EQ Rate Area

Premium Rate(EQ) =
EQ Annual average Loss / Replacement Cost

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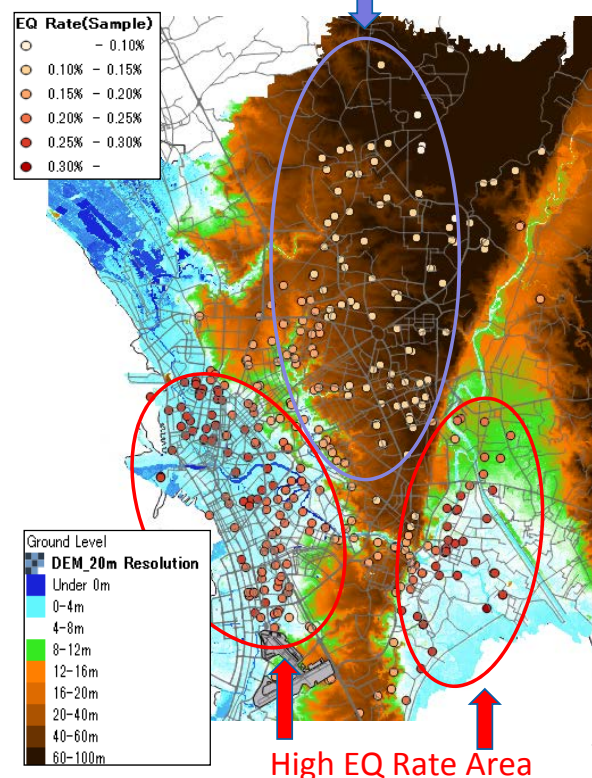
Pricing Results – West Valley Fault Event -

Right Figure shows the EQ Damage Ratio by West Valley Fault event.

Serious school damaged are estimated around West Valley Fault.

If West Valley earthquake occurred, many schools will collapse and public government need to rebuild many schools.

We should retrofit many public schools to protect children from Natural Disasters.

West Valley Fault
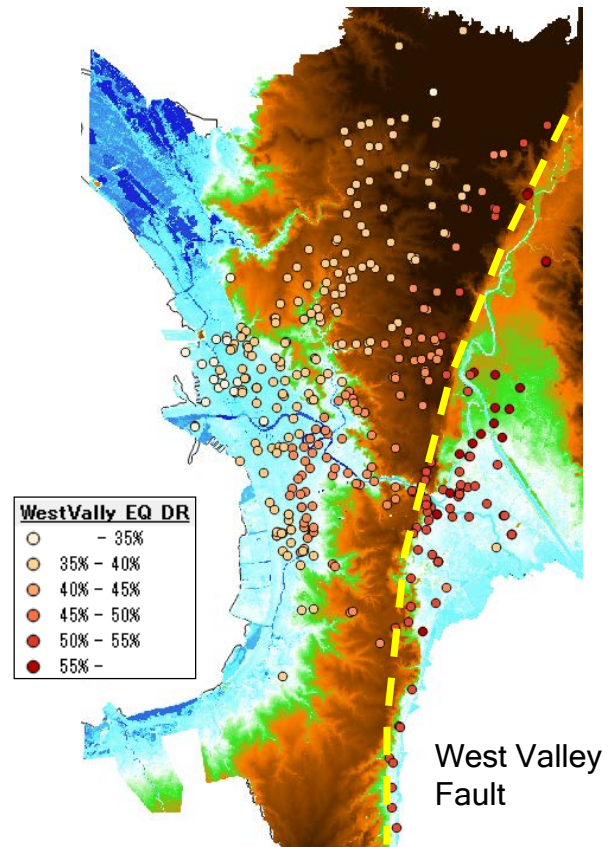
巻末資料 2 ： GIS 講義テキスト

Data Collection Survey on the Insurance Mechanism for Incentivizing Disaster Resilient Public Infrastructures in Metro Manila

Fundamentals of GIS

November 2016

JICA Study Team
(Kazutoshi MASUDA)

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Contents

- About GIS
- GIS Data
- Coordinate Systems
- Typical Functions is GIS
- About QGIS Open Source Software
- Conclusion

2

About GIS

- A Geographic Information System (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.

Data Type can be handled in GIS

- Several kinds of data types are available in GIS
  - Vector Data (Polygon, Line, Point)
  - Raster Data (Image files, Scanned file)
  - Tabular Data (MS Excel, MS Access, CSV etc.)
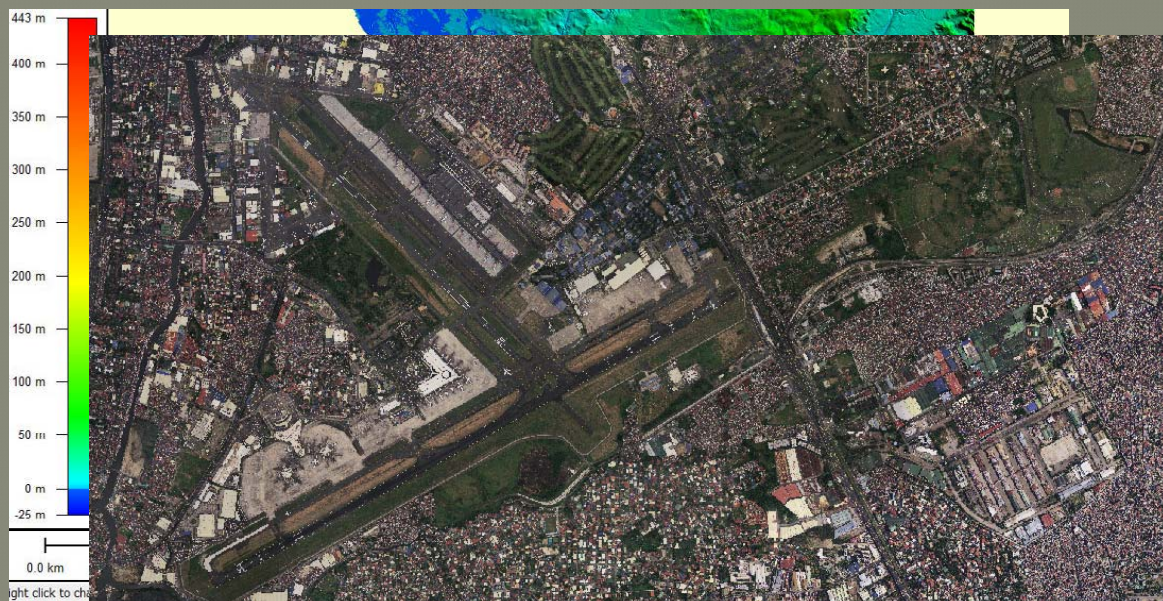
Vector Data

⊙ Vector data is expressed as a point , line or polygon
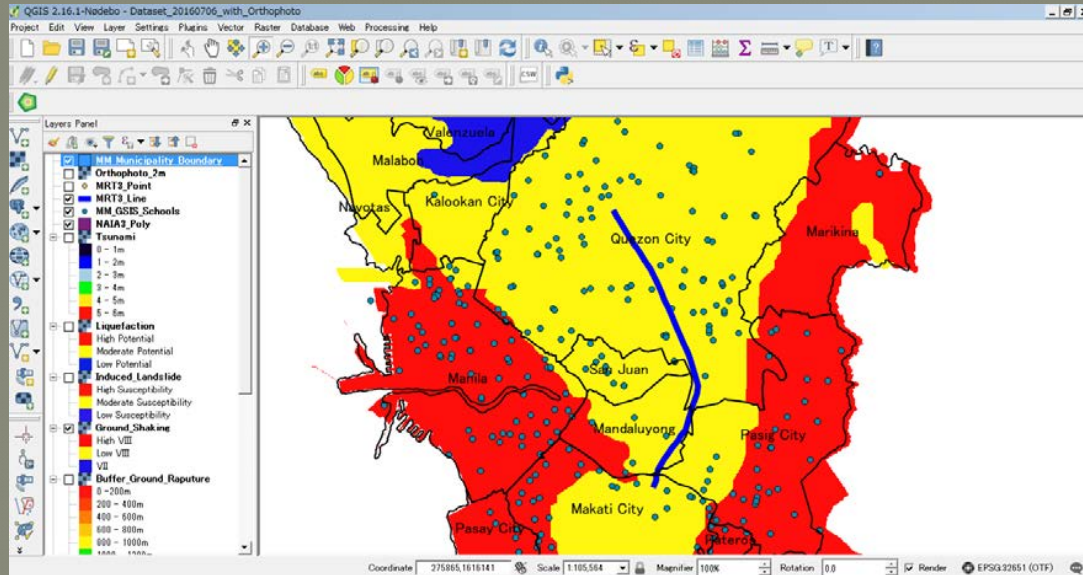
Raster Data

⊙ Raster data is expressed as TIF or JPG file

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Tabular Data

⦿ Tabular data is prepared as MS Excel sheet, MS Access sheet or CSV file.

Map Coordinate Systems

⦿ There are main two (2) coordinate systems in GIS

- Projected Coordinate System (Meter Unit)

- Geographic Coordinate System (Latitude/Longitude Unit)

Projected Coordinate System

- UTM (Universal Transvers Mercator) coordinate system is one of the typical projected coordinate system and being widely used in the world.
- UTM is divided into 2 areas, north and south hemisphere
- In addition, each area is divided into 60 zones with 6 degrees
- Manila Metropolitan Area belongs to Zone 51 North (From 120E to 126E)
- Unit of projected (UTM) coordinate system is meter

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Geographic Coordinate System

- X coordinate is Longitude
  - East longitude is "+"
  - West longitude is "-"
- Y coordinate is Latitude
  - North latitude is "+"
  - South latitude is "-"
- Unit is Degree（Decimal Degree）

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Typical Functions in GIS

- Data Conversion
- Data Display
- Map Layout
- Attribute Data Edit
- Spatial Data Analysis
- Data Export

Data Conversion

- Converting Map Coordinate System
  - This function is used to convert map coordinate system from Projected to Geographic or Geographic to Projected
  - Because in GIS, basically different coordinate systems can not be used together for the analysis, therefor all the data used in GIS should have same map coordinate systems

Function for Conversion of Map Coordinate System in GIS
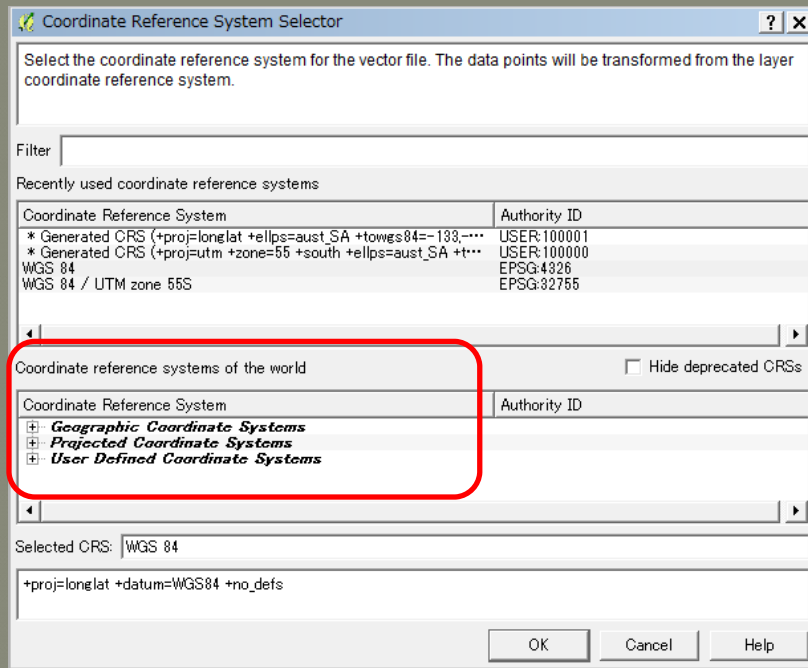
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Data Display

⊙ GIS supports several kinds of data display methods

- Single Color Display
- Categorized Color Display
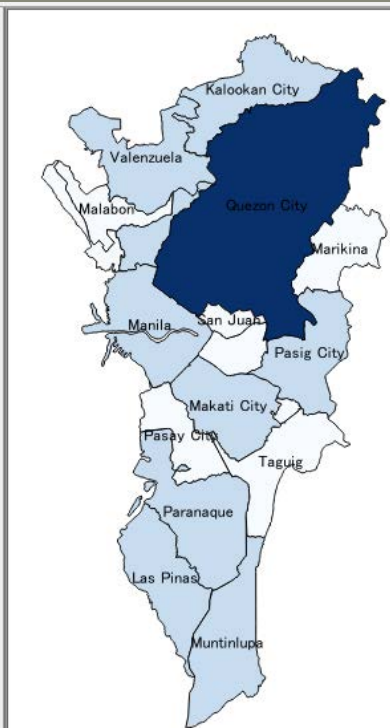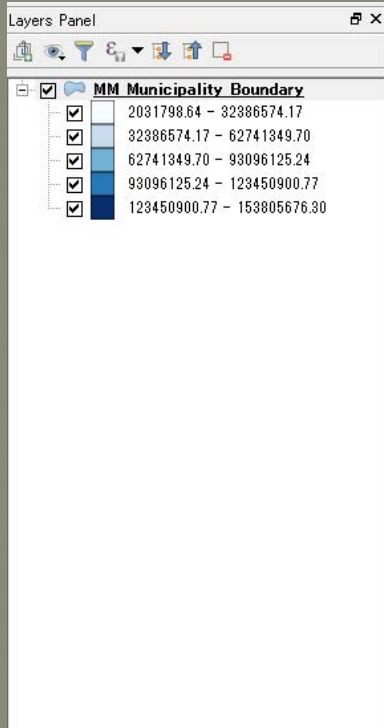- Graduated Color Display

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Single Color

Categorized Color

Layers Panel

MM Municipality Boundary
- Kalookan City
- Las Pinas
- Makati City
- Malabon
- Mandaluyong
- Manila
- Marikina
- Muntinlupa
- Navotas
- Paranaque
- Pasay City
- Pasig City
- Pateros
- Quezon City
- San Juan
- Taguig
- Valenzuela

Graduated Color

Layers Panel

MM Municipality Boundary
- 2031798.64 – 32386574.17
- 32386574.17 – 62741349.70
- 62741349.70 – 93096125.24
- 93096125.24 – 123450900.77
- 123450900.77 – 153805676.30

◆ Area
◆ Population
◆ Population Density
◆ Gender Ratio
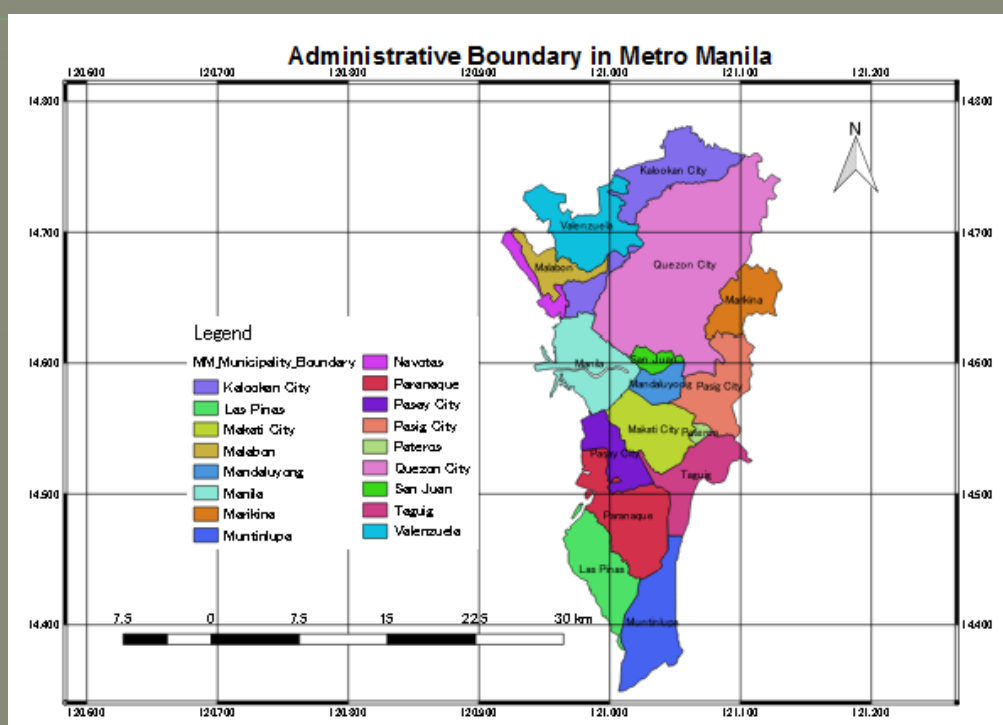◆ Any kinds numerical
   value or ratio

Map Layout

⊙ It is easy to create a map with map elements using "Map Layout" function in GIS

- Map Elements
  - ◆ Map Title
  - ◆ North Arrow
  - ◆ Legend
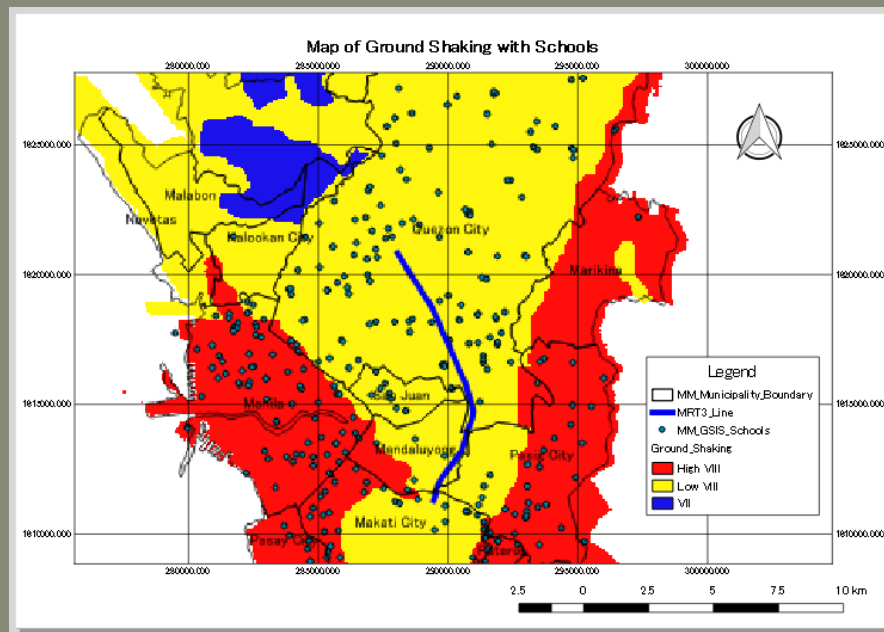 - ◆ Scale Bar
  - ◆ Grid Lines

Example of Map Layout (1)

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Example of Map Layout (2)


Map of Ground Shaking with Schools

Attribute Data Edit

- Following works are possible using this functions
  - Add new attribute field
  - Remove existing field
  - Calculate area (polygon) & length (line)
  - Calculate indices (Population density, Gender ratio etc.)
  - Join other table (MS Excel etc.)
  - Convert from GPS data prepared as tabular data to Point Data

Case Example of QGIS Functions (4)

Easy to calculate area using Geometry function in QGIS
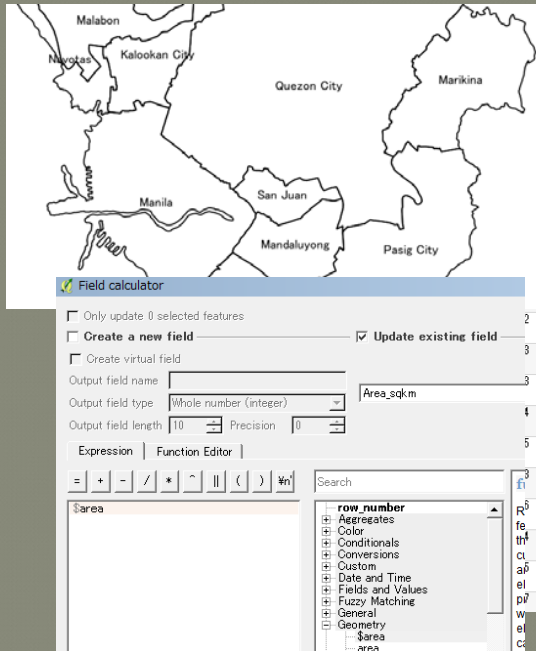
	ENGTYPE_2	NL_NAME_2	VARNAME_2	District	Area_sqkm
	City			Northern Manil···	48843415.72
	City		Las Pinas, City of	Southern Manil···	34460892.08
	City		Makati, City of	Southern Manil···	32997335.45
	City			Northern Manil···	15187561.54
	City		Mandaluyong, C···	Eastern Manila ···	11372836.30
	City		City of Manila···	City of Manila	38117855.25
	City		Marikina, City of	Eastern Manila ···	23018160.91
	City		Muntinlupa, Cit···	Southern Manil···	39993523.32
	City			Northern Manil···	8175728.00
	City		Paranaque, City···	Southern Manil···	45882875.89
	City			Southern Manil···	19401173.95
	City		Pasig, City of	Eastern Manila ···	32792186.51
	City			Southern Manil···	2031798.64
	City			Eastern Manila ···	153805676.30
	City			Eastern Manila ···	6008811.11
	City			Southern Manil···	28731879.32

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Case Example of QGIS Functions (3)

Easy to convert from Excel to GIS in QGIS

| A	B	C	D	E	F	G	H	I
No	School ID	School Name	Division	Total Buildings	Total Storeys	Total Rooms	Longitude	Latitude
4	136421	Lapu-Lapu Elementary School	City of Manila	1	3	22	120.978347	14.631421
7	136424	Melchora Aquino Elementary School	City of Manila	1	3	30	120.977287	14.62684
13	136430	Arsenio H. Lacson Elementary School	City of Manila	1	3	32	120.9674509	14.62883428
25	136442	R. Almario ES - Isla Puting Bato ES	City of Manila	2	4	8	120.9550333	14.60205278
26	136443	Gen. Gregorio del Pilar ES	City of Manila	5	10	60	120.9762186	14.60662193
31	136448	Cecilio Apostol Elementary School	City of Manila	1	3	29	120.9845306	14.6190767
38	136455	M. Agoncillo ES	City of Manila	1	4	22	120.9702979	14.59780597
42	136459	Dr. Benigno Aldana Elementary School	City of Manila	1	4	30	121.0002131	14.61227766
48	136465	Juan Luna Elementary School	City of Manila	1	5	63	120.9897742	14.60555419
51	136468	Pedro Pelaez Elementary School	City of Manila	2	6	18	121.00991	14.603981
54	136478	H. I. Afonza Elementary School	City of Manila	3	12	101	120.961243	14.594092
			City of Manila	1	3	11	120.9557472	14.59811667
			City of Manila	2	9	93	120.9699092	14.61786317
			City of Manila	3	10	94	120.9636073	14.61107538
			City of Manila	2	8	59	120.9612787	14.6235018
			City of Manila	2	8	48	120.9702679	14.62893366
			City of Manila	8	20	116	120.973129	14.627301
			City of Manila	4	12	121	120.9738459	14.60297914
			City of Manila	2	8	102	120.9729914	14.60501129
			City of Manila	5	13	60	120.9784943	14.5890453
			City of Manila	2	9	140	120.9922785	14.59793346
			City of Manila	2	6	64	121.0016535	14.59812588
			City of Manila	3	9	46	120.957723	14.591027

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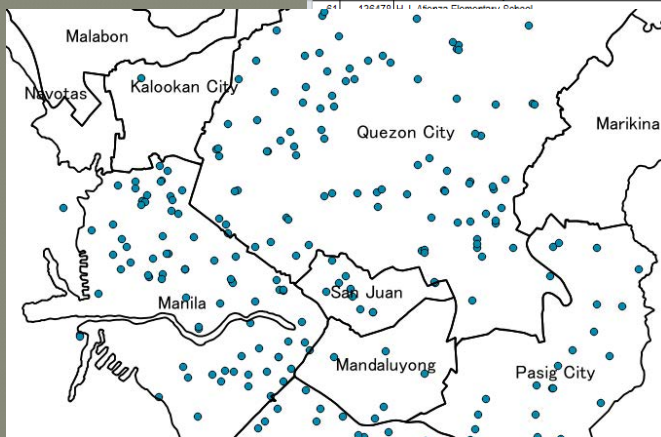
Spatial (Map) Data Analysis

⊙ Typical functions for spatial data analysis are shown below

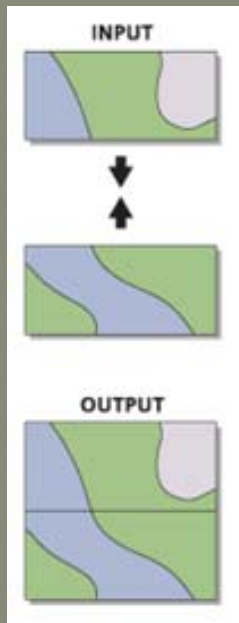- Clip
- Merge
- Buffer
- Dissolve
- Intersect
- Union
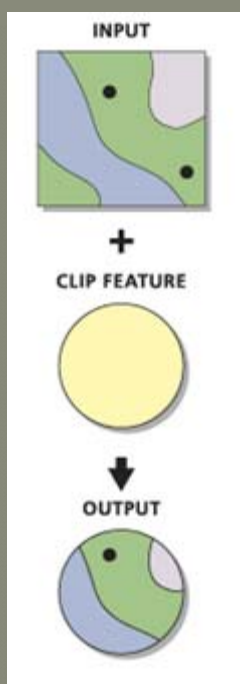
Clip

⊙ Extracts input feature by the overlaid clip feature

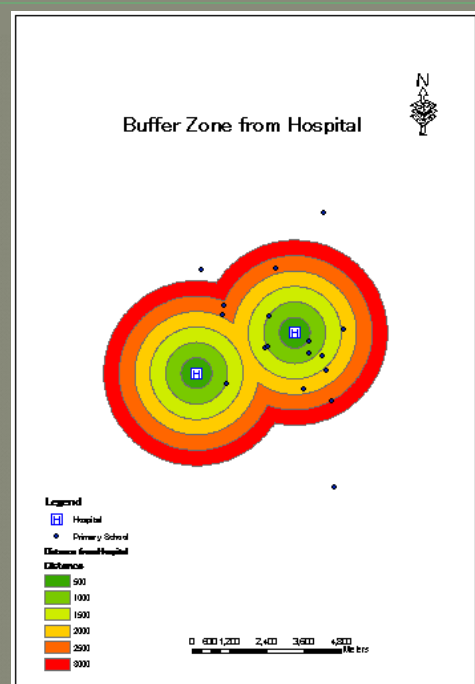⊙ For instance, using this, topographic maps by administrative boundary can be produced.

Merge

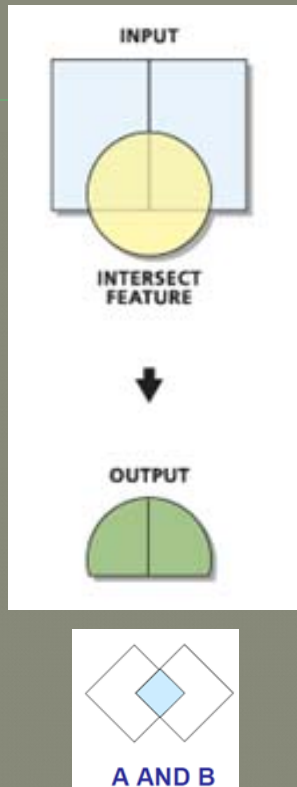- Using merge function, multiple sheets (data) can be combined

Buffer

- This analysis is effective to understand the spatial relationship between feature and feature

Buffer Zone from Hospital

Intersect (AND)

INPUT

INTERSECT
FEATURE

↓

OUTPUT

A AND B

- This is used to find out areas that are satisfied by at least two condition
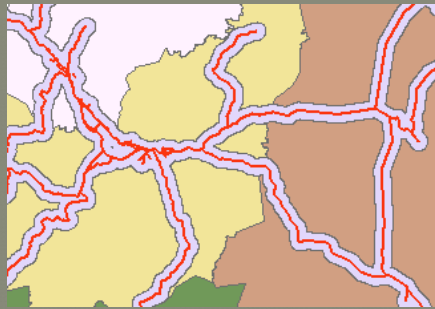- This analysis is effective to select suitable areas for urban development plan, agricultural development and so on.
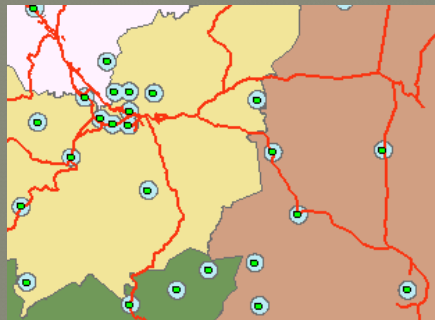
Example of Intersection

- You want to construct a new primary school.
- You want to construct it near the paved roads.
- You want to construct it near the hospitals

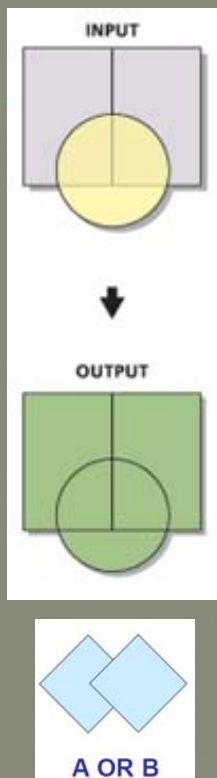# Example of Intersect Analysis

2km distance from paved roads

After intersecting

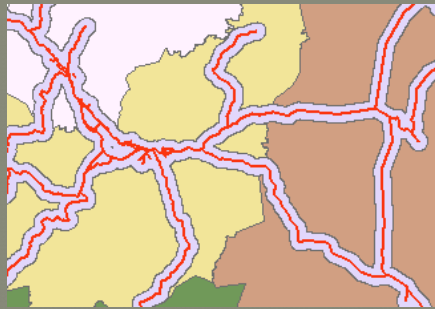**2km distance from hospitals**
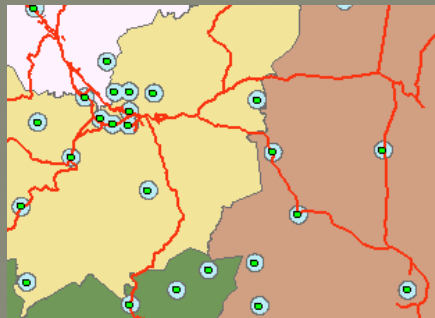

Union (OR)

INPUT

OUTPUT

A OR B

◉ This is used to find out areas that are satisfied by either A condition or B condition

◉ This analysis is effective to select suitable areas for urban development plan, agricultural development and so on.

Example of Union Analysis

2km distance from paved roads

2km distance from hospitals

About QGIS Open Source Software

- Nowadays, QGIS OSS is being widely utilized for GIS analysis in the world
- Everyone can install the software into any PCs (License free)
- The QGIS can be run on the Windows, MacOS, Android, Linux and so on
- An abundance of GIS functions are equipped in QGIS despite it is license free
- QGIS is strongly recommended that it is very powerful and no need O&M costs

QGIS 2.14.7 Essen
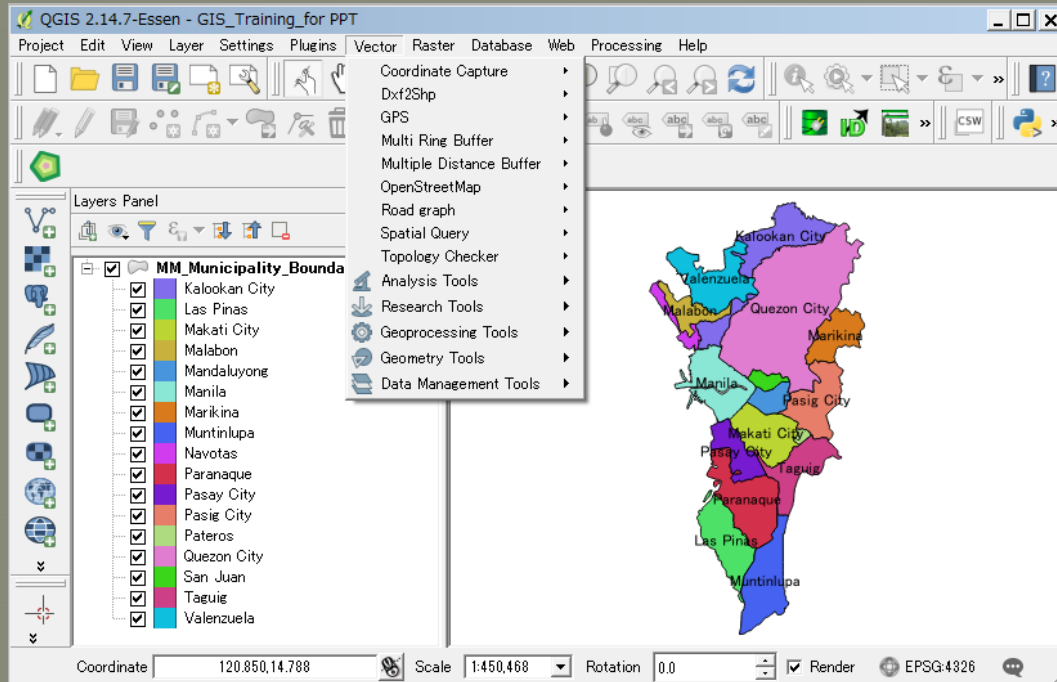
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Conclusion

- GIS is a very powerful and useful tool for your daily works in terms of the data analysis and the data management.
- It is extremely easy for you to operate GIS software, however you need some basic knowledge and skills on the geospatial information, such as map coordinate systems, data type and typical GIS function.
- It is strongly recommended that you use GIS software everyday in your works. It is a shortcut to acquire GIS skills !

巻末資料 3 ： QGIS 操作マニュアル

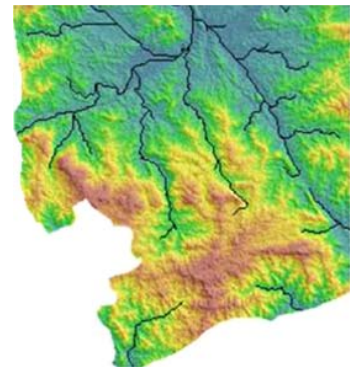# Operation Manual on QGIS 2.14
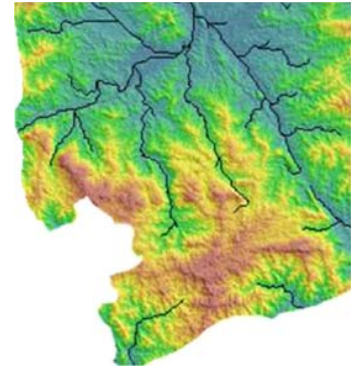## Day 1 & 2 (Nov. 17-18, 2016)
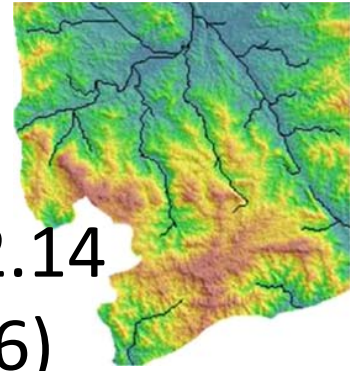
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Contents

1. QGIS Browser
2. Data Conversion
3. Data Display
4. Map Layout
5. Attribute Table Edit
6. Spatial Edit Functions

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1. QGIS Browser

Introduction

- QGIS Browser comes as a standalone application after QGIS version 1.8. This is like windows explore where we use to manage our files in windows operating system. Browser panel also can accessible from QGIS desktop application as well.

- This is very useful tool to manage your GIS datasets. ArcGIS users may find this it as an application similar to ArcCatalog.

Standalone QGIS Browser

- Let`s get started with the Browser. You can open the browser from program menu or icon in your desktop.
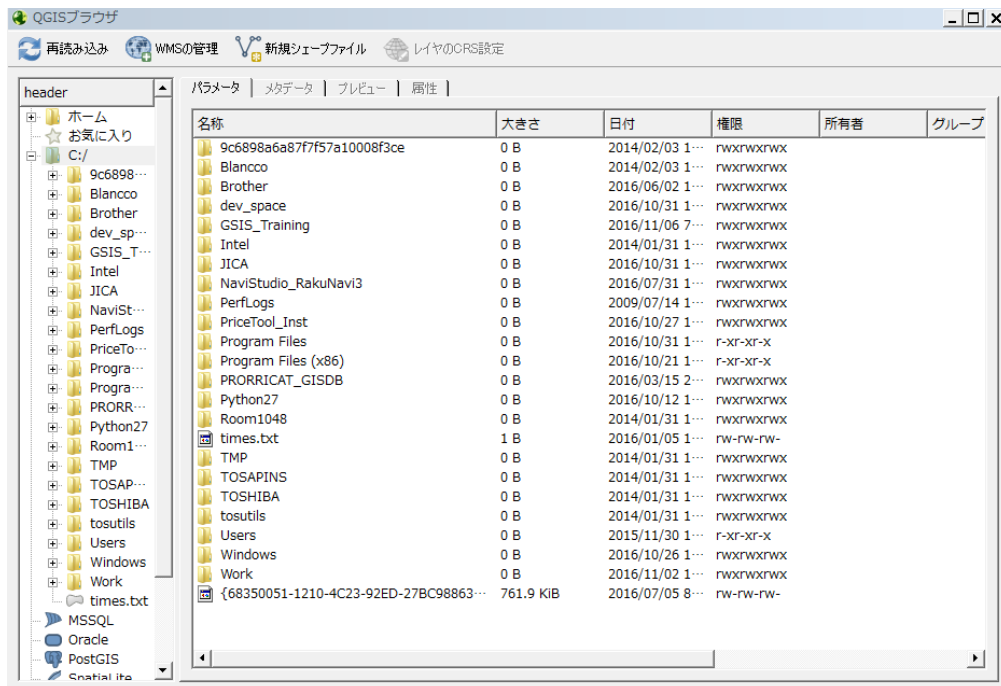
- Browse your dataset from navigation bar

Explore all the active tabs (Metadata, Preview, Attributes)
Here, **Preview** tab is selected. You can use it have glimpse about dataset.
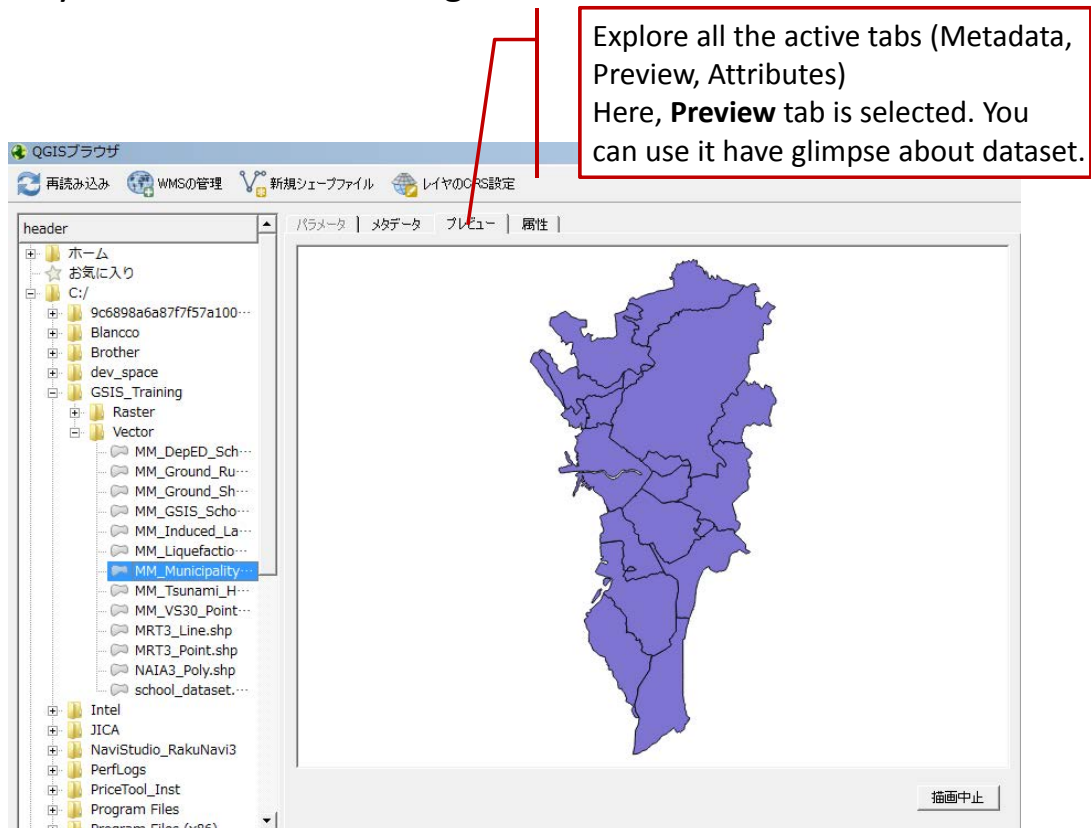
Attributes tab lists out the attribute table of the selected dataset.
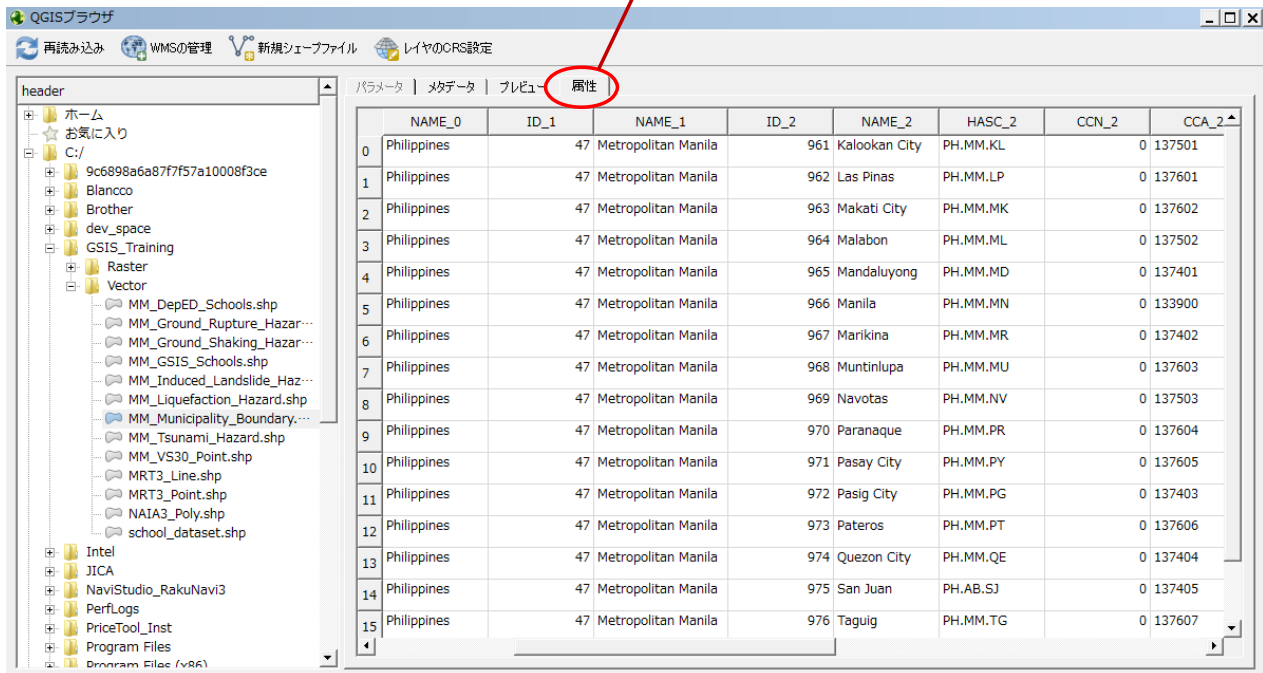
Metadata tab provides description about the selected dataset.
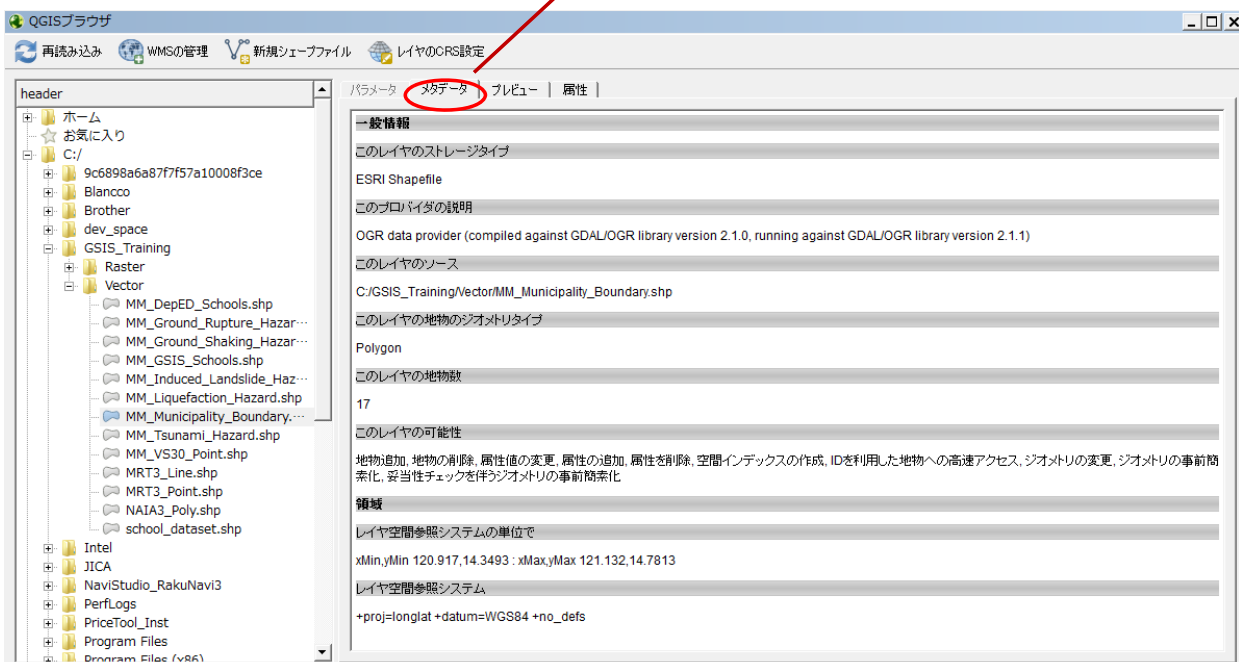
Browser Panel in QGIS desktop

- You can access the QGIS browser inside the QGIS desktop application as well.

1. Go to View > Panels > Browser

2. Drag and drop to locate its position

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Browser Panel in QGIS desktop

1. Locate your data set by folder list

2. Right click on the data folder > Add as a favorite

By adding to favorite, it will be easy to work with your data set and save your time too
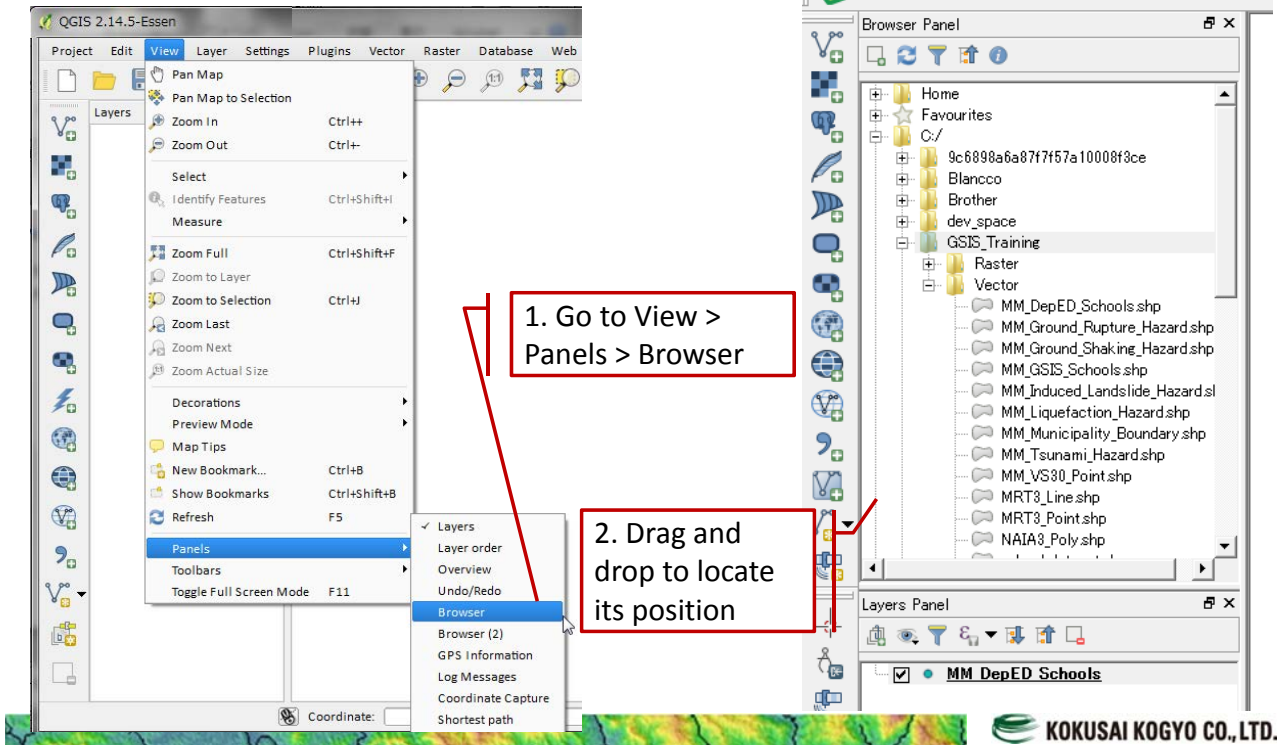
KOKUSAI KOGYO CO., LTD.
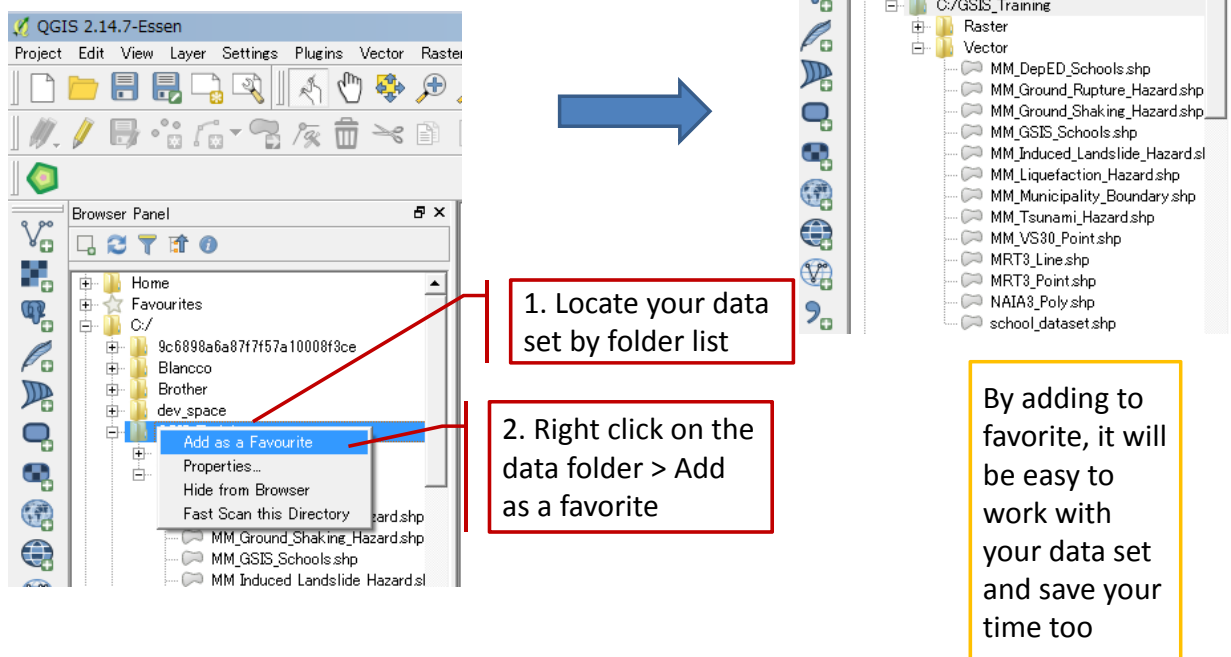
Display data directory from browser panel to map area
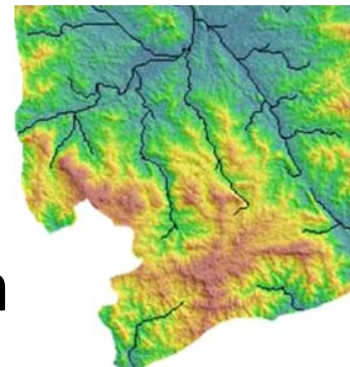
1. Drag and drop your data to map area

2. Data Conversion

Conversion of Map Coordinate System
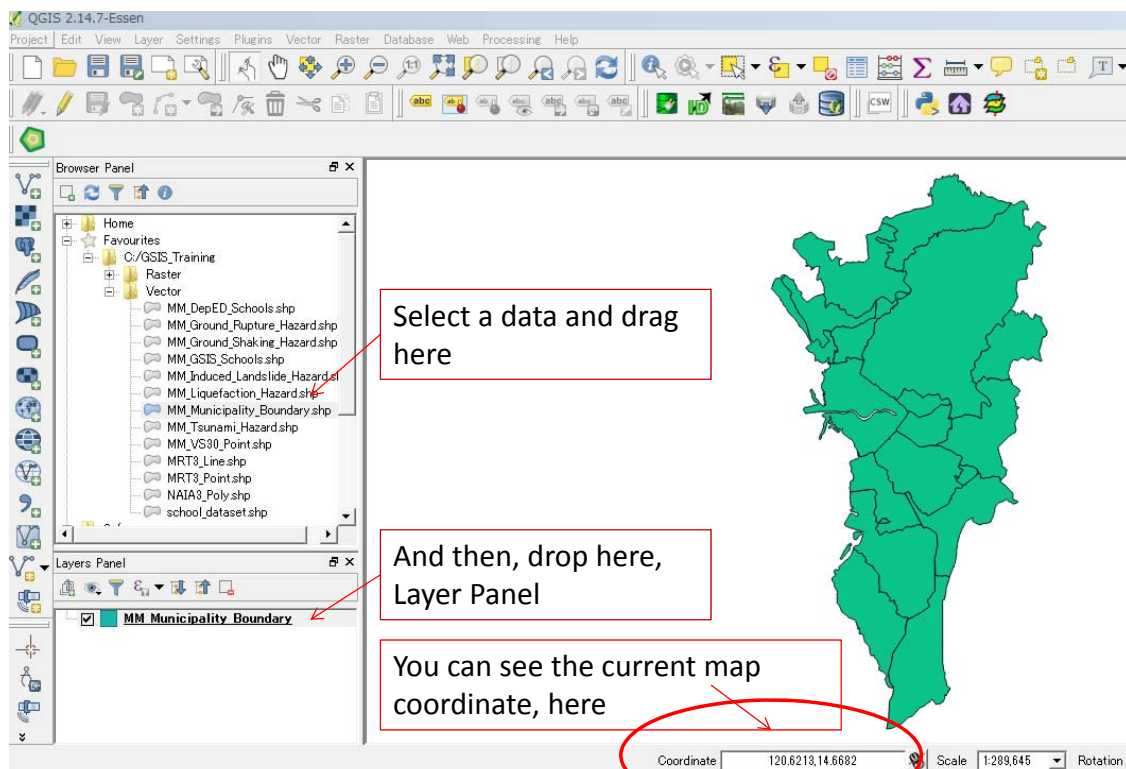
Conversion of Map Coordinate System

- QGIS has a function to convert map coordinate systems
- We can convert from geographic coordinate system (Latitude/Longitude) to UTM coordinate system or UTM to geographic.

Step1: Add a target layer on the map

Select a data and drag here

And then, drop here, Layer Panel

You can see the current map coordinate, here

Step 2: Select added layer > Right click > Save as

Select the added layer and right click

Select "Save as"
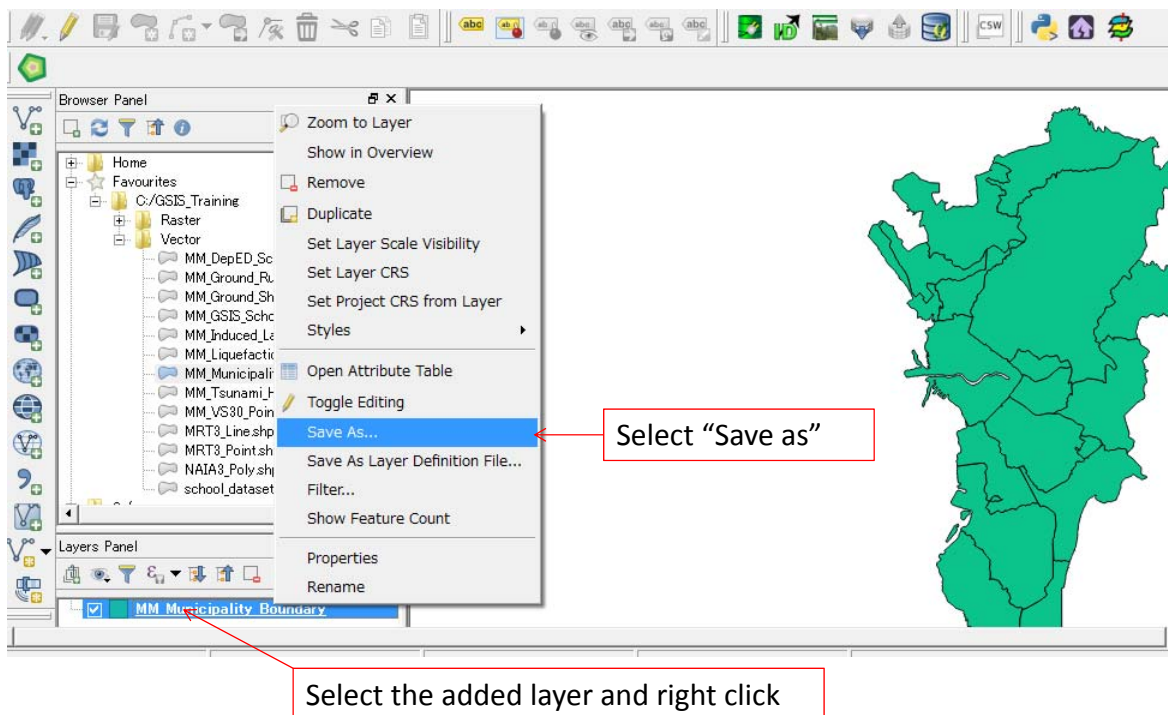
Step 3: Select a map coordinate system which you want to convert
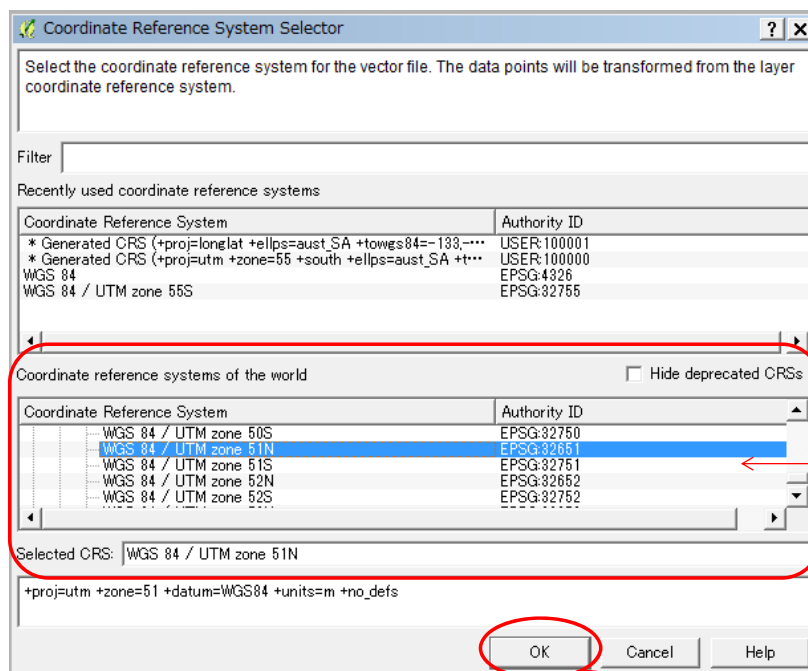
From this box, choose the proper map coordinate system

Finally click "OK" after setting

Step 4: Browse > Enter the output file name

Click here

Enter the output file name here

Finally click "Save"

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Step 5: Click "OK"

Finally, make sure "Format", "Saved file name" and "CRS (map coordinate system)"
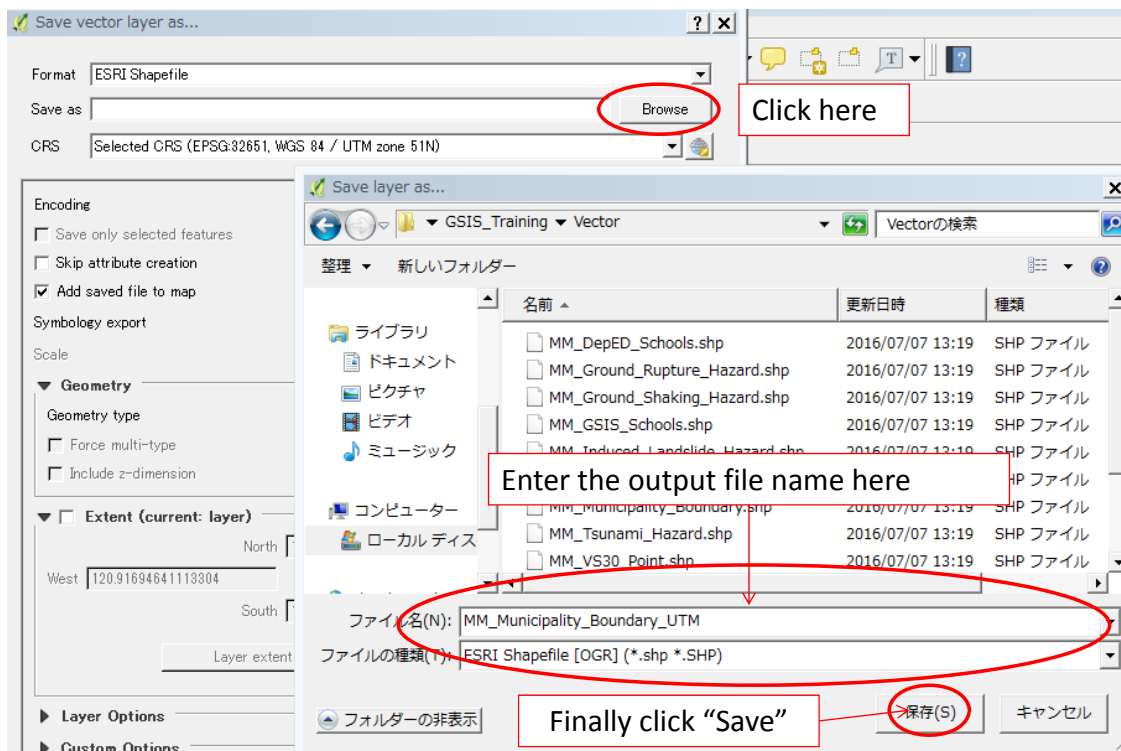
Click OK

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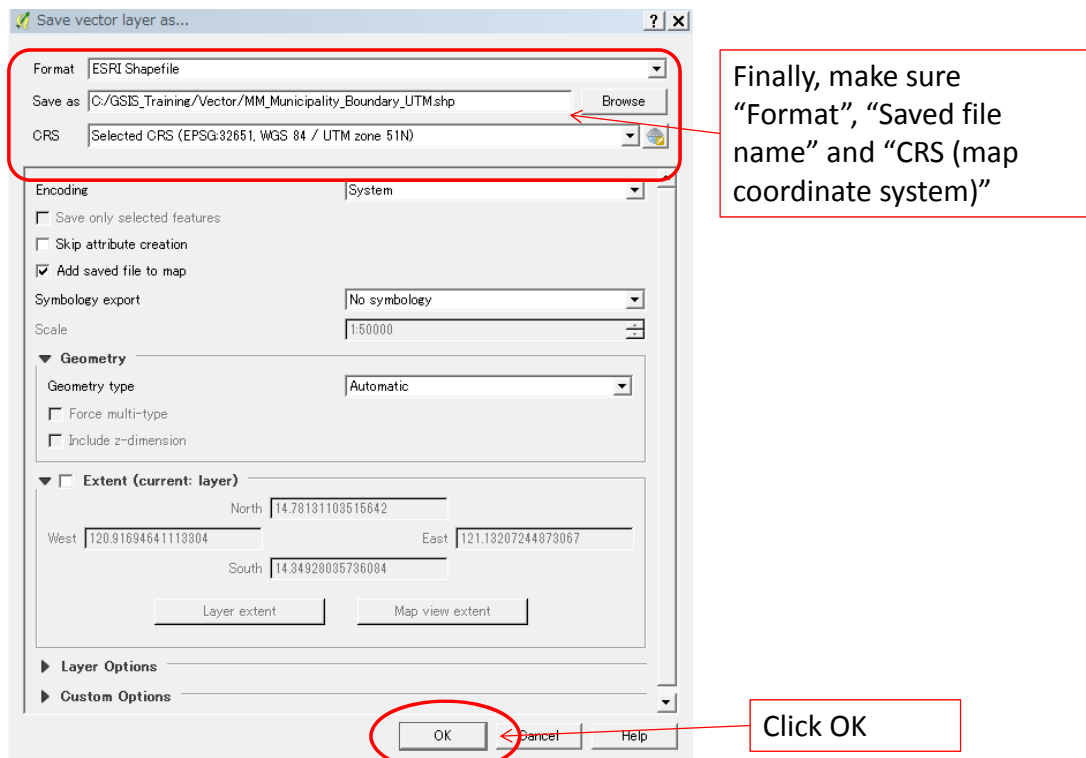
Converted Map is added as a new layer

Original file and Converted file
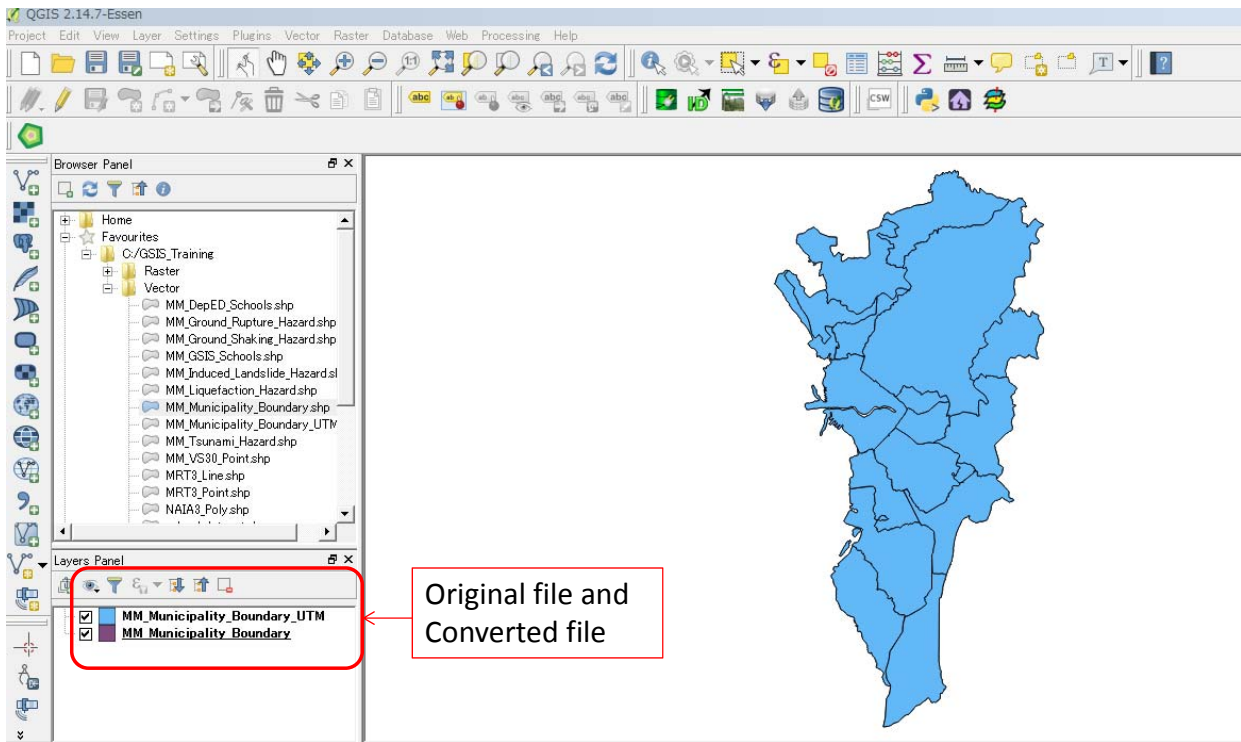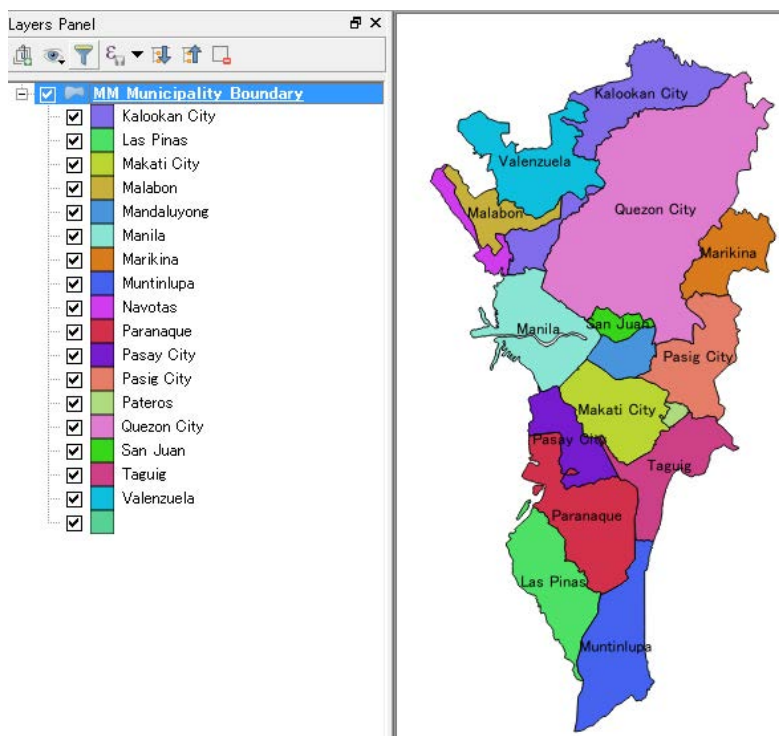
3. Data Display

Data Display Method in QGIS

- There are typical data display methods and labeling functions in QGIS

  ➢ Single Color Display
  ➢ Categorized Color Display
  ➢ Graduated Color Display
  ➢ Labeling functions

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Initial steps

- Open QGIS desktop application then follow the steps
- 1. You can use browser panel to add data

Other ways to add data explain below (most recommended method is to use browser panel)

2.
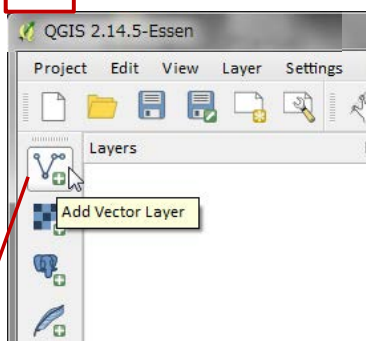
You can directly click Add Vector Layer icon from the toolbar.
Or step 3.

3.
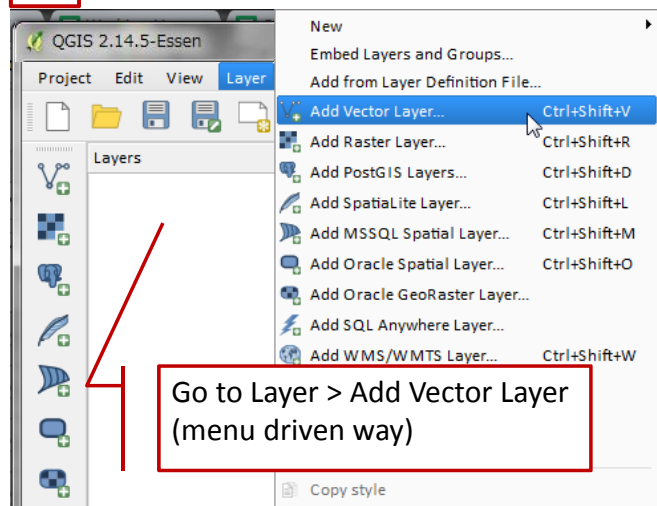
Go to Layer > Add Vector Layer (menu driven way)

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Single Color Display
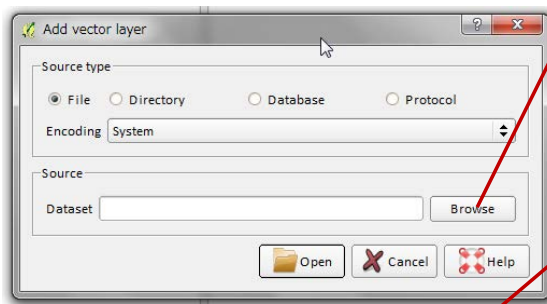
1. Click [Browse] to locate your data set

2. Browse data directory
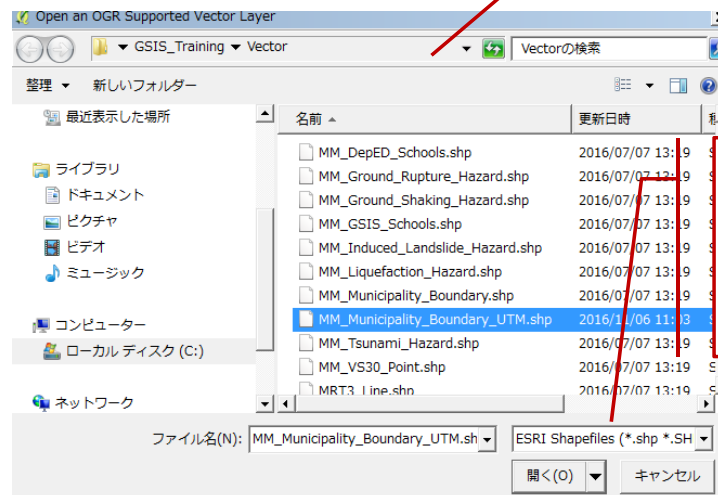
3. If "All files" is selected, you can see all the supportive files of .shp file format. You can change this to "ESRI Shapefiles"
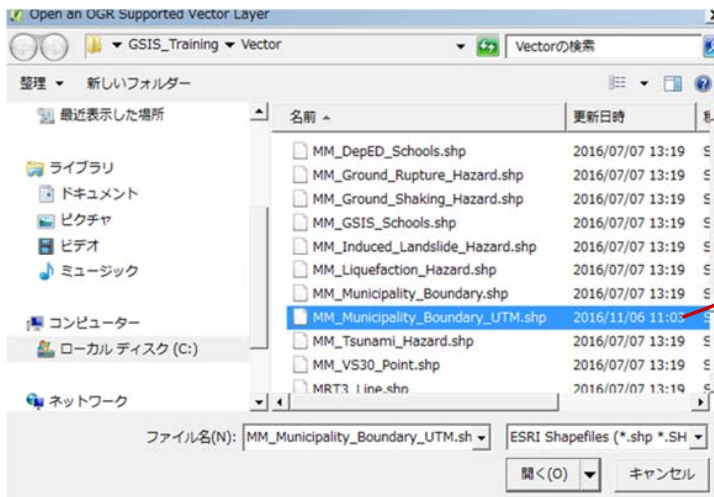
4. Select data and then click [Open]
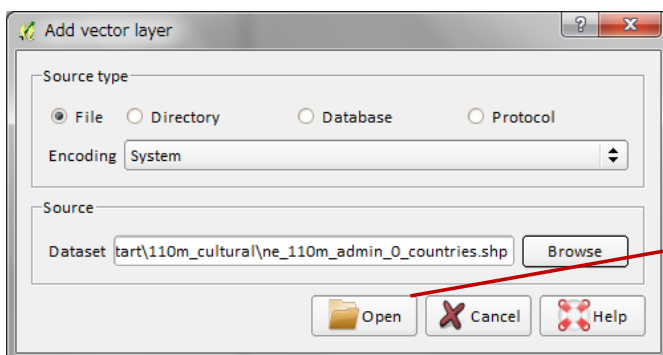
5. Click [Open]

Finally you can display a GIS data here

Single color

Vector layer symbolization explains in this section (single color, categorized color, graduated color, graduated symbol and chart)
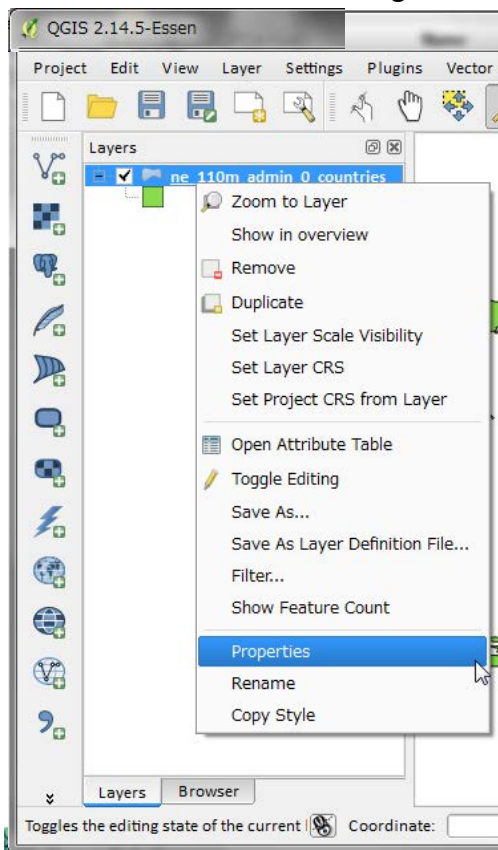
1. Right click on vector layer ➔ go to Properties

2. Go to "Style" tab

3. Select "Single Symbol" from the dropdown menu

4. Click color icon then select appropriate color from popup window
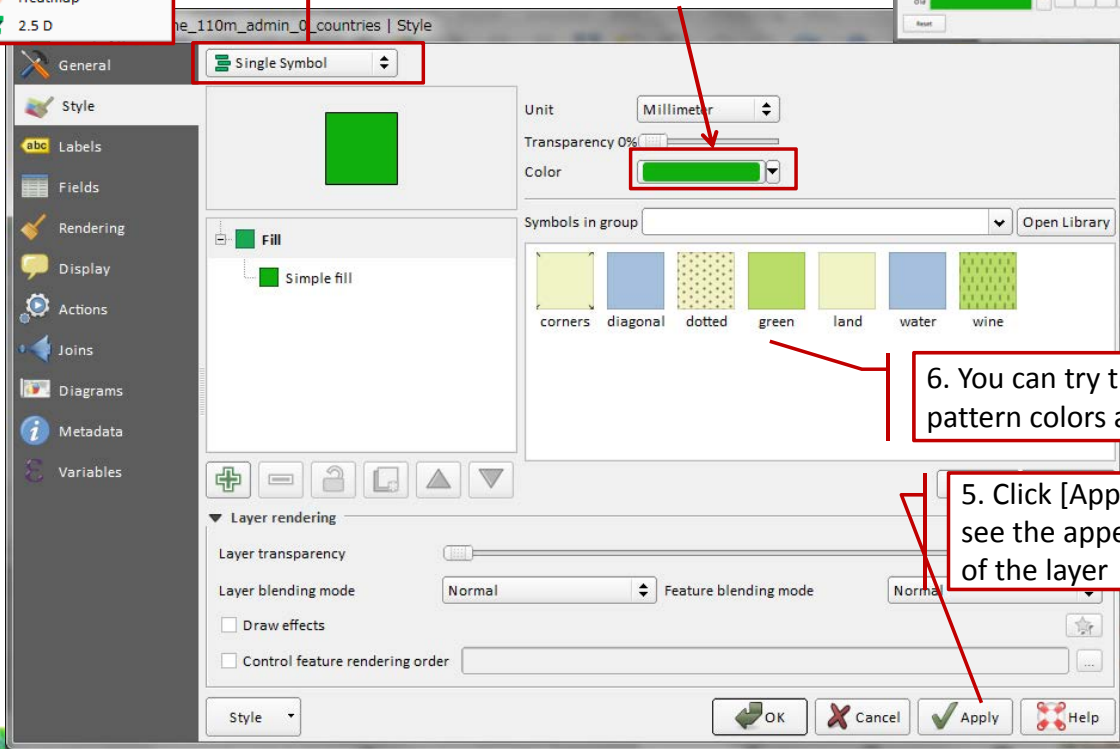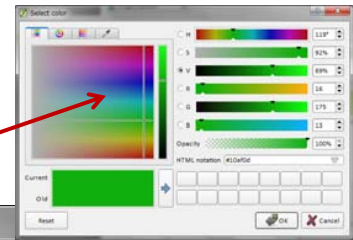
6. You can try these pattern colors as well.

5. Click [Apply] and see the appearance of the layer

| Single Symbol |
| Categorized |
| Graduated |
| Rule-based |
| Point Displacement |
| Inverted Polygons |
| Heatmap |
| 2.5 D |

ne_110m_admin_0_countries | Style

General
Style
Labels
Fields
Rendering
Display
Actions
Joins
Diagrams
Metadata
Variables

Single Symbol

Unit   Millimeter
Transparency 0%
Color

Fill
  Simple fill

Symbols in group   Open Library

corners diagonal dotted green land water wine

▼ Layer rendering

Layer transparency
Layer blending mode   Normal   Feature blending mode   Normal
☐ Draw effects
☐ Control feature rendering order

Style ▾   OK   Cancel   Apply   Help

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7. By click on Simple fill you can access more customizing options right side

8. Try to change fill and border colors, fill style, border style, border width, etc. Always you can click [Apply] and see the appearance. Finally, you can click [OK].

Layer Properties - ne_110m_admin_0_countries | Style

General
Style
Labels
Fields
Rendering
Display
Actions
Joins
Diagrams
Metadata
Variables

Single Symbol

Fill
  Simple fill

Symbol layer type   Simple fill

Colors   Fill   Border
Fill style   Solid
Border style   Solid Line
Join style   Bevel
Border width   0.260000   Millimeter
Offset X,Y   0.000000   0.000000   Millimeter

☐ Draw effects

▼ Layer rendering

Layer transparency   0
Layer blending mode   Normal   Feature blending mode   Normal
☐ Draw effects
☐ Control feature rendering order

Style ▾   OK   Cancel   Apply   Help

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Finally you can change colors, pattern etc.
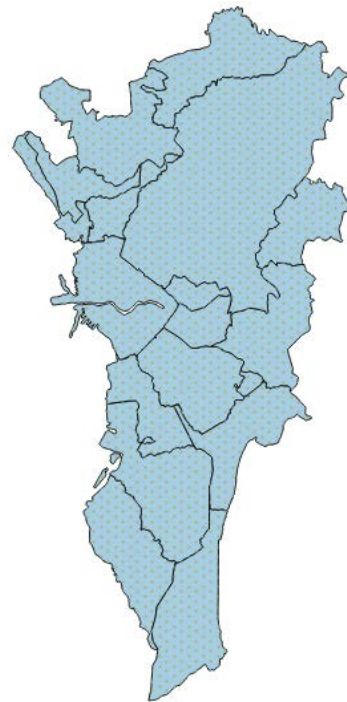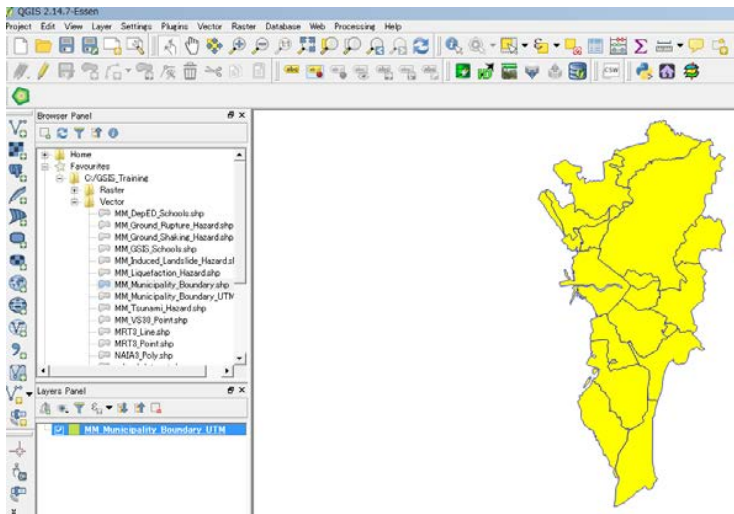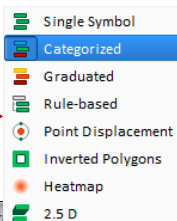
Categorized Color

1. Right click on vector layer ➔ go to Properties
2. Go to "Style" tab
3. Select "Categorized" from the dropdown menu
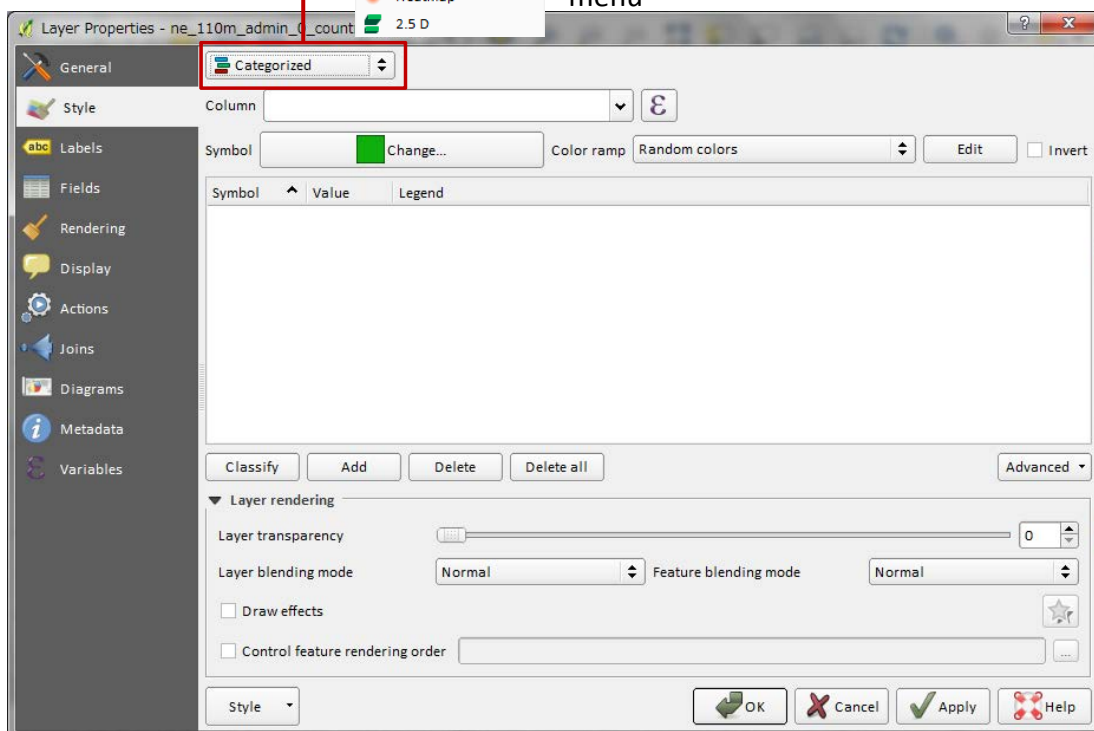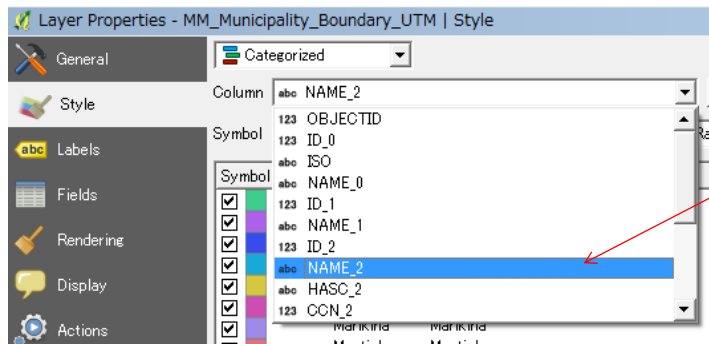
4. You have to select appropriate column (these columns available from attribute table of the particular layer) to categorized and assign colors to the data layer.
Select "NAME_2"

Hint: if you want to see the attribute table before the selection, right click on vector layer ➔ go to [Open Attribute Table]

Attribute Table

5. Select "Name_2"

6. Click [Classify]

7. Click [Apply] then examine the colors

Categorized Color based on Municipality Names

8. If you want to change the color pallet, click on "color ramp drop-down list" and select a new color ramp

9. Click [Delete all] to remove the existing color ramp

10. Click [Classify] to add new color ramp

7. If you want to change the color pallet, click on "color ramp drop-down list" and select a new color ramp

9. Click [Delete all] to remove the existing color ramp

10. Click [Classify] to add new color ramp

Graduated Color

Single Symbol
Categorized
Graduated
Rule-based
Point displacement

1. Right click on vector layer ➔ go to Properties
2. Go to "Style" tab
3. Select "Graduated" from the dropdown menu

Layer Properties - ne_110m_admin_0_countries | Style

- General
- Style
- Labels
- Fields
- Rendering
- Display
- Actions
- Joins
- Diagrams
- Metadata

▶ Layer rendering

Graduated

Column

Symbol   Change...   Classes 5

Color ramp   Blues   ☐ Invert   Mode Equal Interval

Symbol ▲	Value	Label

Classify | Add class | Delete | Delete all | Advanced ▾

Load Style ... | Save As Default | Restore Default Style | Save Style ▾

OK | Cancel | Apply | Help

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Layer Properties - ne_110m_admin_0_countries | Style

- General
- Style
- Labels
- Fields
- Rendering
- Display
- Actions
- Joins

▶ Layer rendering

Graduated

Column

mapcolor13
pop_est
gdp_md_est
pop_year
lastcensus
gdp_year
wikipedia

4. You have to select appropriate column (these columns available from attribute table of the particular layer) to categorized and assign colors to the data layer.
Select "pop_est" column

Hint: if you want to see the attribute table before the selection,
right click on vector layer ➔ go to [Open Attribute Table]

Attribute Table
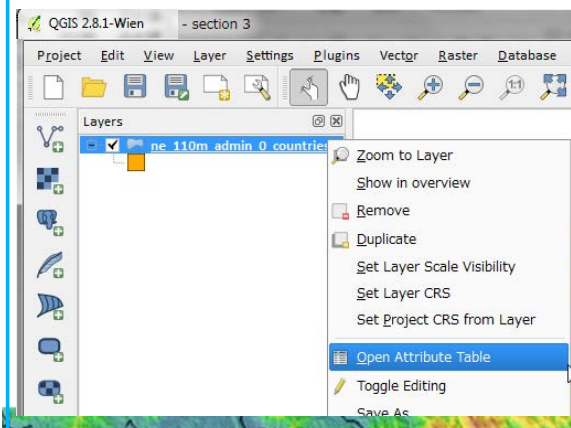
	adm0_a3_un	adm0_a3_wb	continent	region_un	subregion	region_wb
0	-99.000000	-99.000000	Asia	Asia	Southern Asia	South Asia
1	-99.000000	-99.000000	Africa	Africa	Middle Africa	Sub-Saharan A...
2	-99.000000	-99.000000	Europe	Europe	Southern Europe	Europe & Cent...
3	-99.000000	-99.000000	Asia	Asia	Western Asia	Middle East & ...
4	-99.000000	-99.000000	South America	Americas	South America	Latin America ...
5	-99.000000	-99.000000	Asia	Asia	Western Asia	Europe & Cent...
6	-99.000000	-99.000000	Antarctica	Antarctica	Antarctica	Antarctica
7	-99.000000	-99.000000	Seven seas (op...	Seven seas (op...	Seven seas (op...	Sub-Saharan A...
8	-99.000000	-99.000000	Oceania	Oceania	Australia and ...	East Asia & Pa...
9	-99.000000	-99.000000	Europe	Europe	Western Europe	Europe & Cent...
10	-99.000000	-99.000000	Asia	Asia	Western Asia	Europe & Cent...
11	-99.000000	-99.000000	Africa	Africa	Eastern Africa	Sub-Saharan A...

Show All Features

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5. Select "Shape_Area"

6. Click "Classify"

Note: "Shape_Area" column represents estimated area of each municipality
Default parameters;
Classes:5
Mode: Equal Interval

Click "Apply"

Graduated Color Display

Note: As *Default parameters*; Classes:5 and Mode: Equal Interval are used
But color symbolization is not representing data well. Now, you can try to change the
Mode and class interval to apply better representation of data
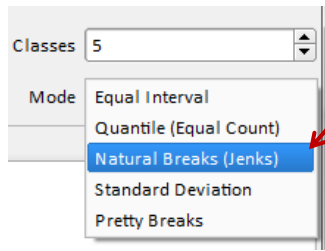
7. Change the Mode to "Natural Breaks (Jenks) and Click [Apply] then examine the colors. You will get better representation. You are now free to change the available options.

Hint: Natural Breaks (Jenks) tries to find natural groupings of data to create classes. The resulting classes will be such that there will be maximum variance between individual classes and least variance within each class.
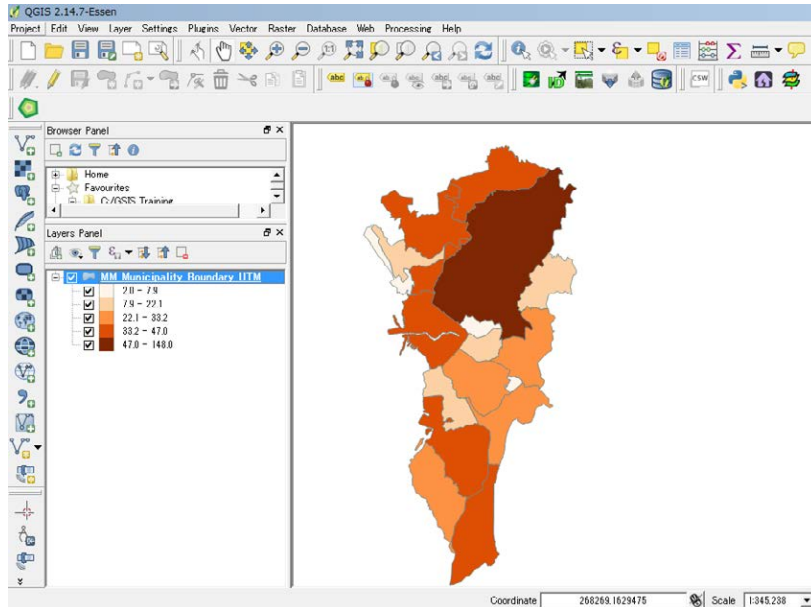
Labeling on the Map

If you want to add labels on the map, such as municipality name, land use type and so on, this function is used. For example, first municipality map is added by any display method.

1. Open Layer Properties > Select "Show labels for this layer
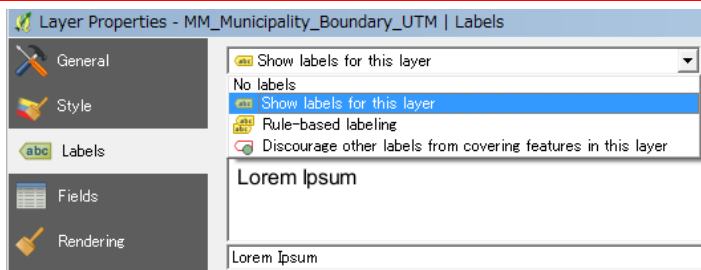
2. Select "Name_2" from Label with box
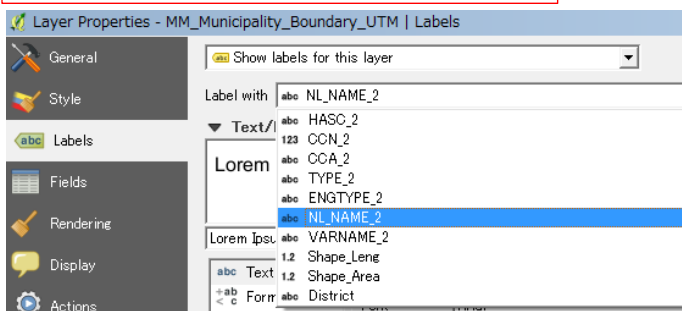
Labeling on the Map
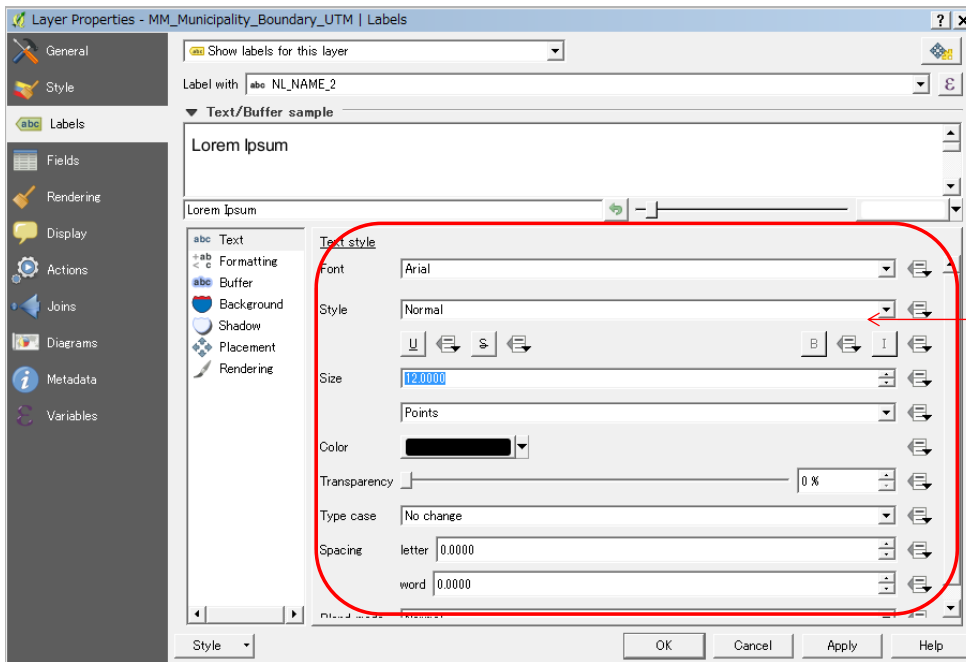
Finally, select font, style, size, color etc.

And then, click "Apply"
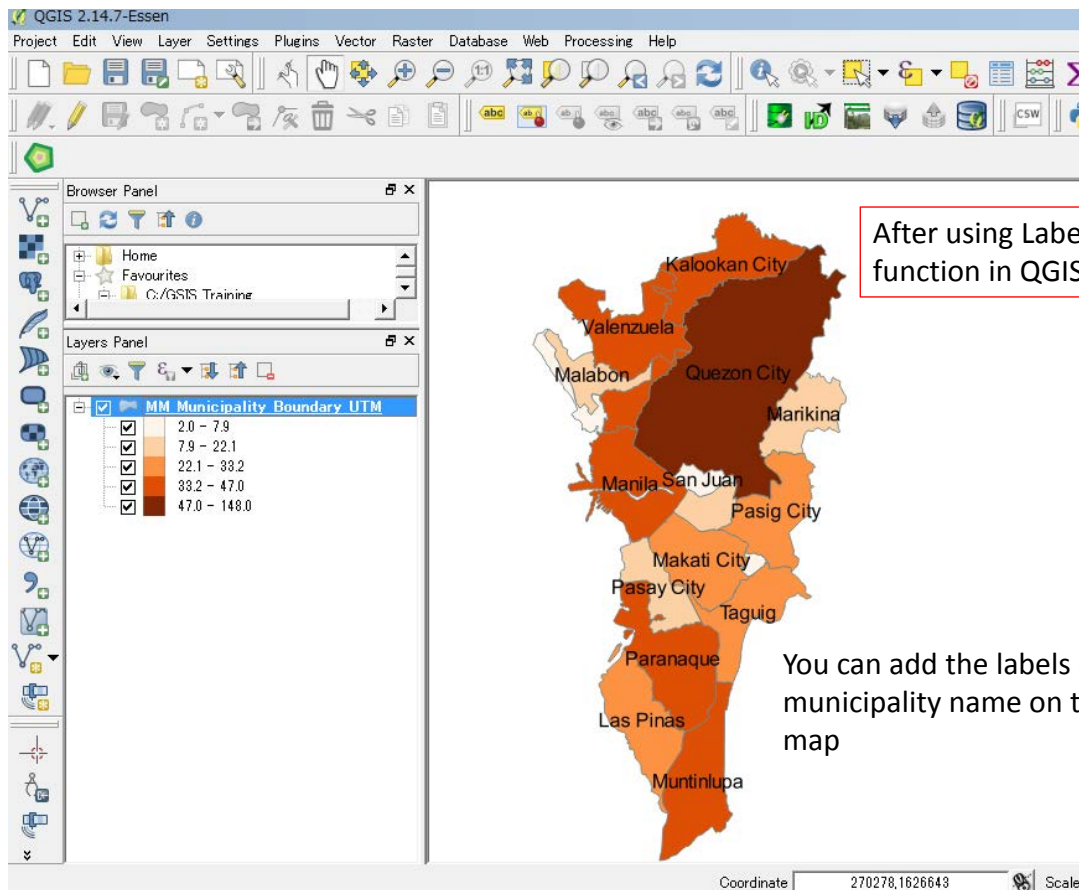
After using Labels function in QGIS

You can add the labels of municipality name on the map

3. Map Layout

Administrative Boundary in Metro Manila
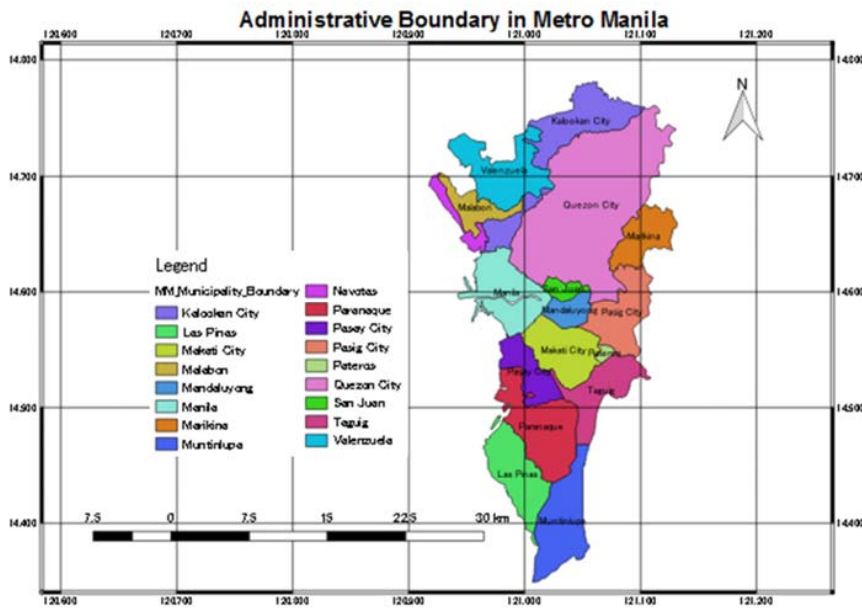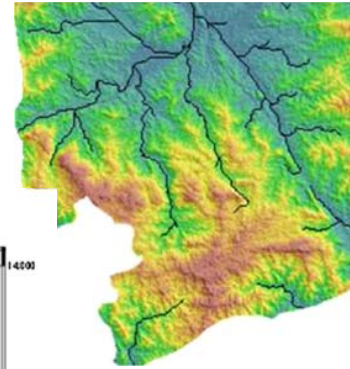
Map Layout Function

Using the function, it can be easy to create a map with map elements, such as map title, north arrow, legend, scale bar and grid lines.

Step 1: Display an administrative boundary map by municipality name
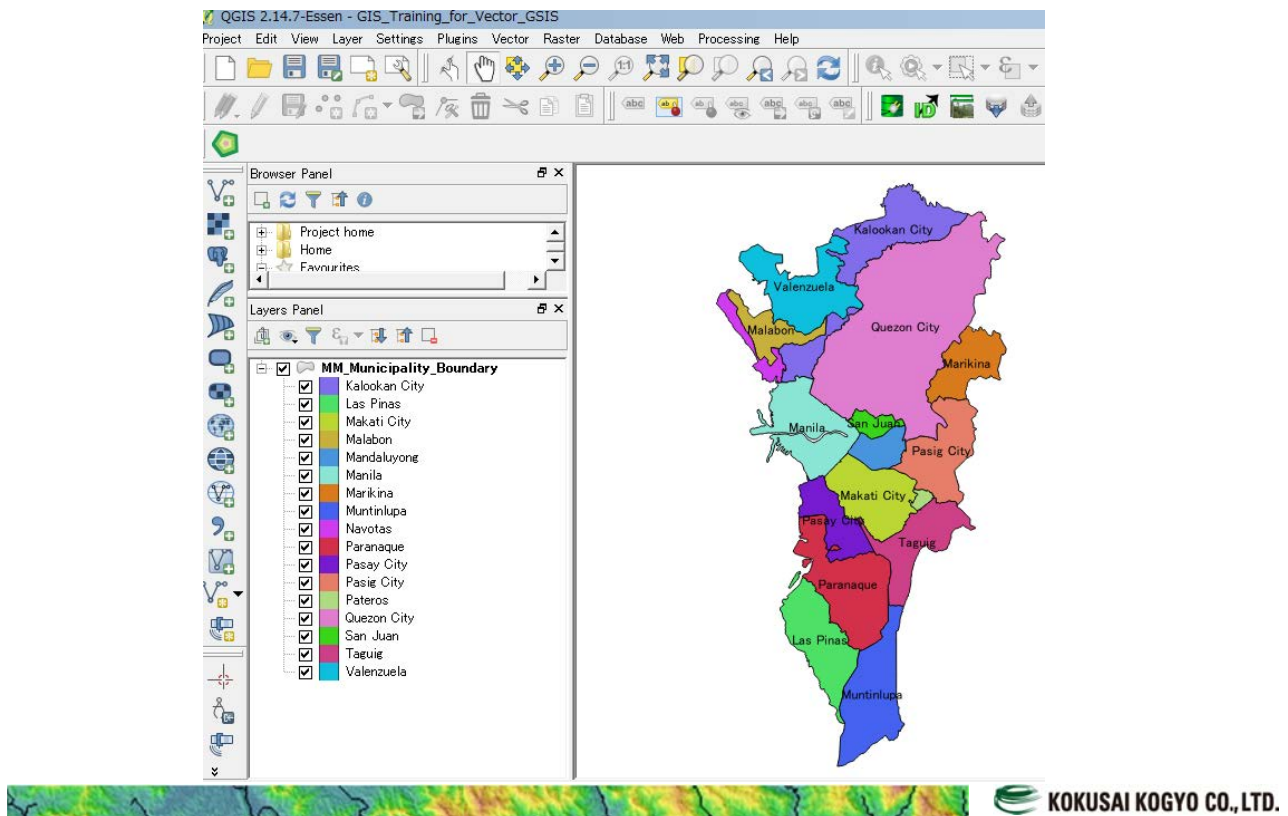
Step 2: Click "Project" in the main menu > Then, Select "New Print Composer"
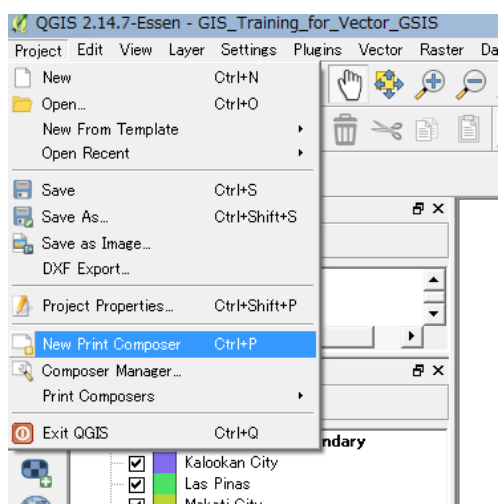
Step 3: Enter the "Composer title", for example "Admin_Map"
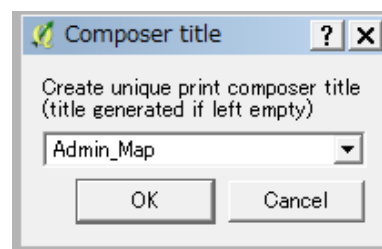
Step 4: Click icon of "Add new map" and Select the area on the map using mouse
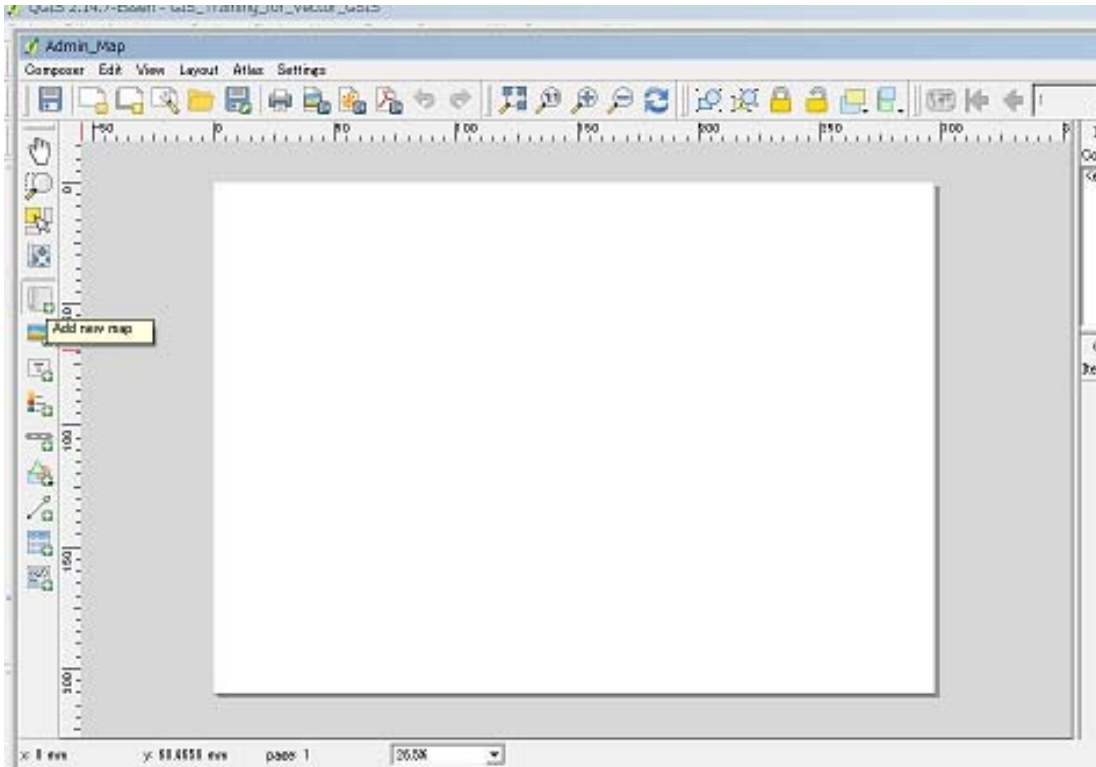
You can add a new map here
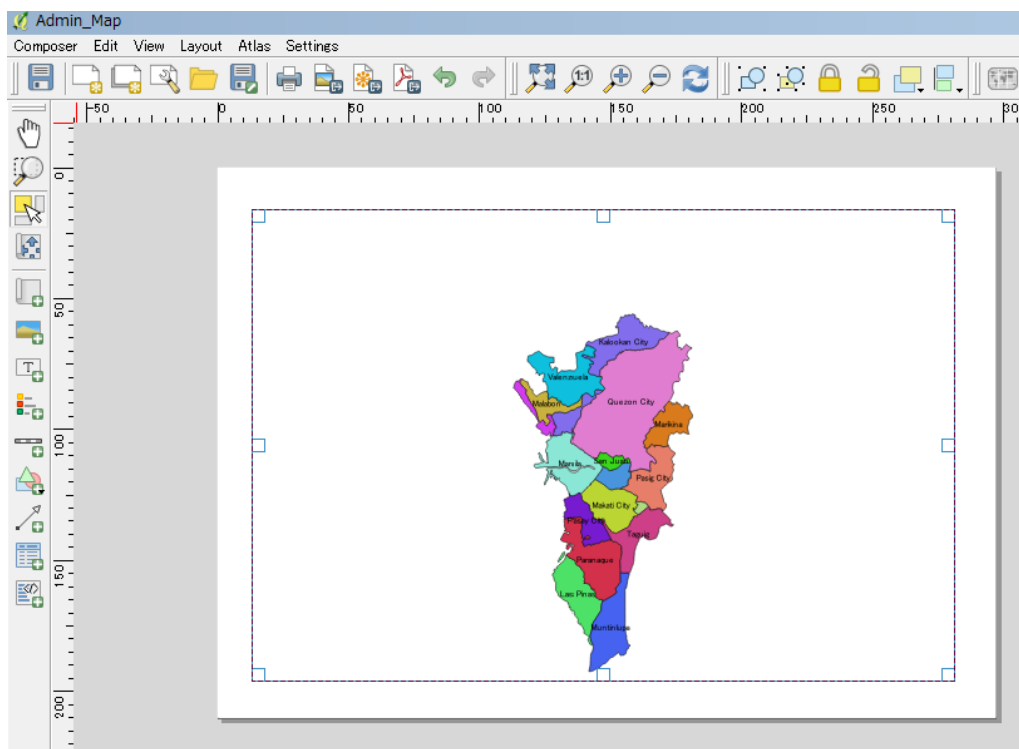
Step 5: Adjust a proper map scale here, you can enter the map scale directory in the scale box.
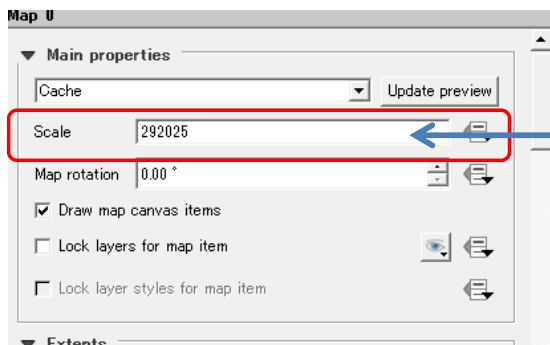
For instance, enter "250,000"
Map scale will change to 1:250,000
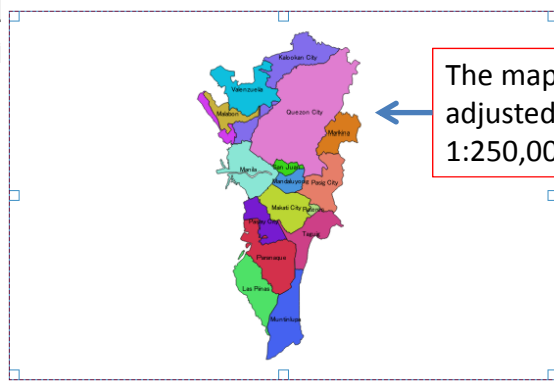
The map was adjusted to 1:250,000

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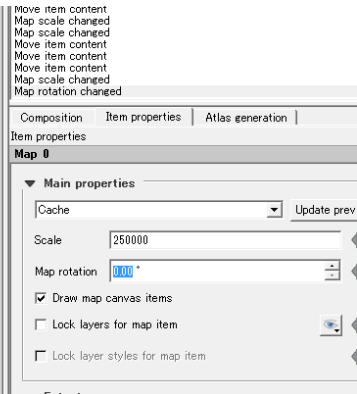
Step 6: Add a Map Title
Click "Layout" > Select "Add Label"
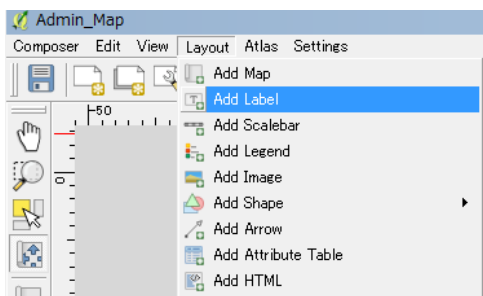
Typing a map title here
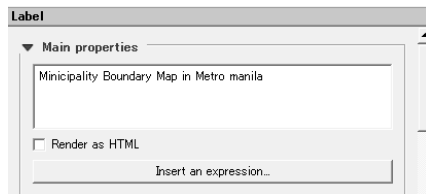
Finally the map title can be added

Adjust font type, size, color and location

KOKUSAI KOGYO CO., LTD.
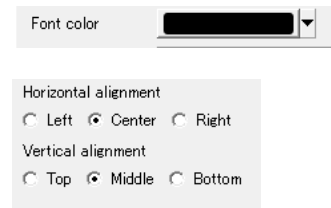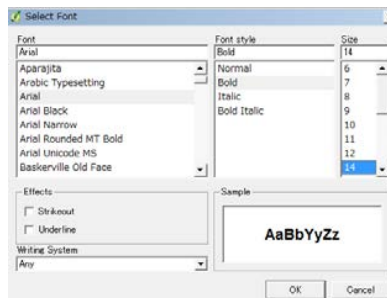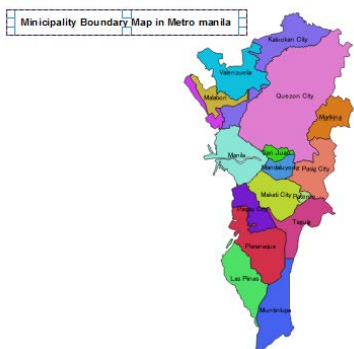
Step 7: Add a scalebar
Click "Layout" > Select "Add Scalebar"
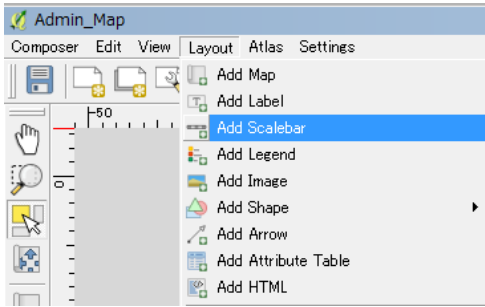
After selecting "Add Scalebar", click the proper location on the map. The scalebar is added.
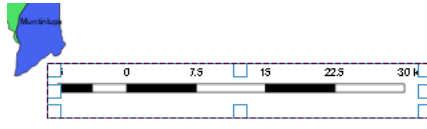
Using some functions prepared in Scalbar, you can change stype, label for units, segments etc.

KOKUSAI KOGYO CO., LTD.
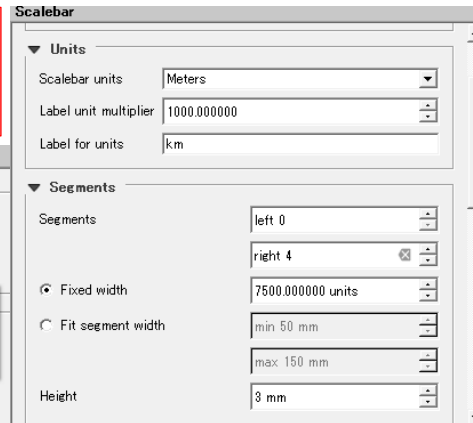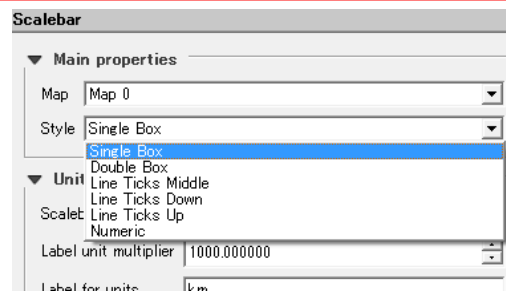
Step 8: Add a Legend
Click "Layout" > select "Add Legend"
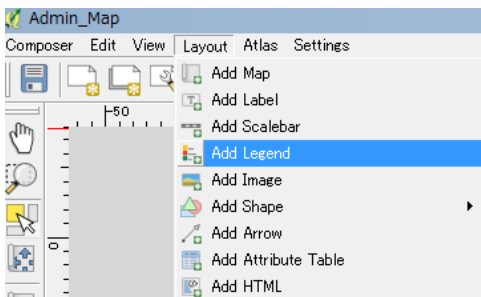
Set a location where you want to add the legend using mouse
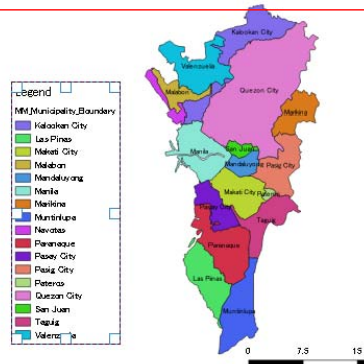
If you want change the number of columns, font type, size, color, use the functions you can see right area

KOKUSAI KOGYO CO., LTD.
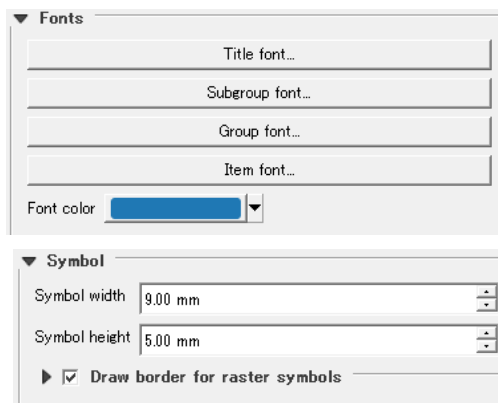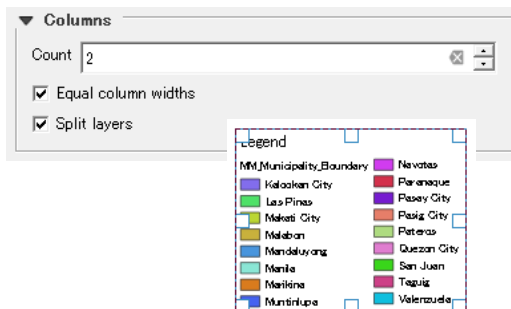
Step 9: Add a North Arrow
Click "Layout" > Select "Add Image"
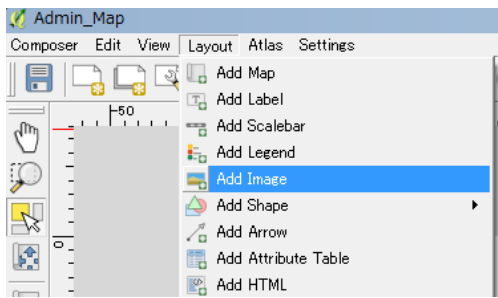
Finally, you adjust the location and size for north arrow

Select an image of north arrow you like

Minicipality Boundary Map in Metro manila

KOKUSAI KOGYO CO., LTD.
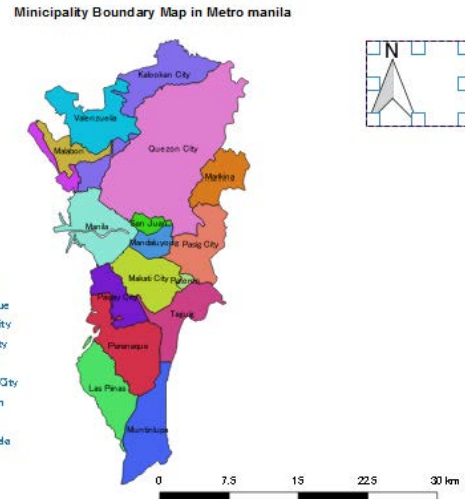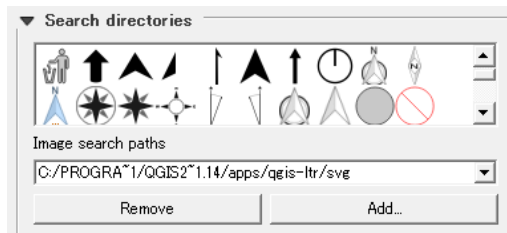
Step 10: Add grid lines
Select Map Area > Extract Grids > Click "+" icon > Select Grid type
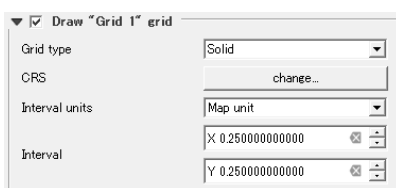
Set grid frame
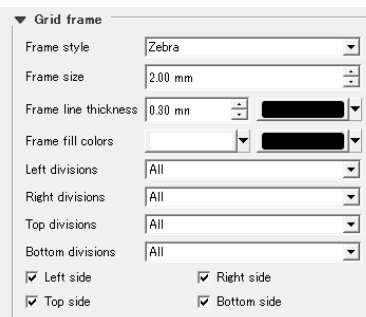
Set grid coordinates

Set Interval of grid

KOKUSAI KOGYO CO., LTD.
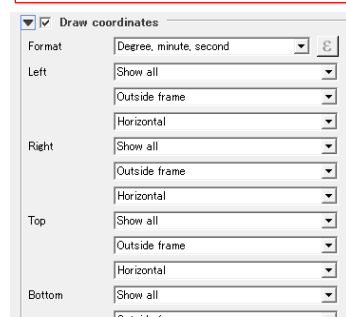
Step 11: Export Map as PDF file

Click "Composer" > Select ""Export as PDF
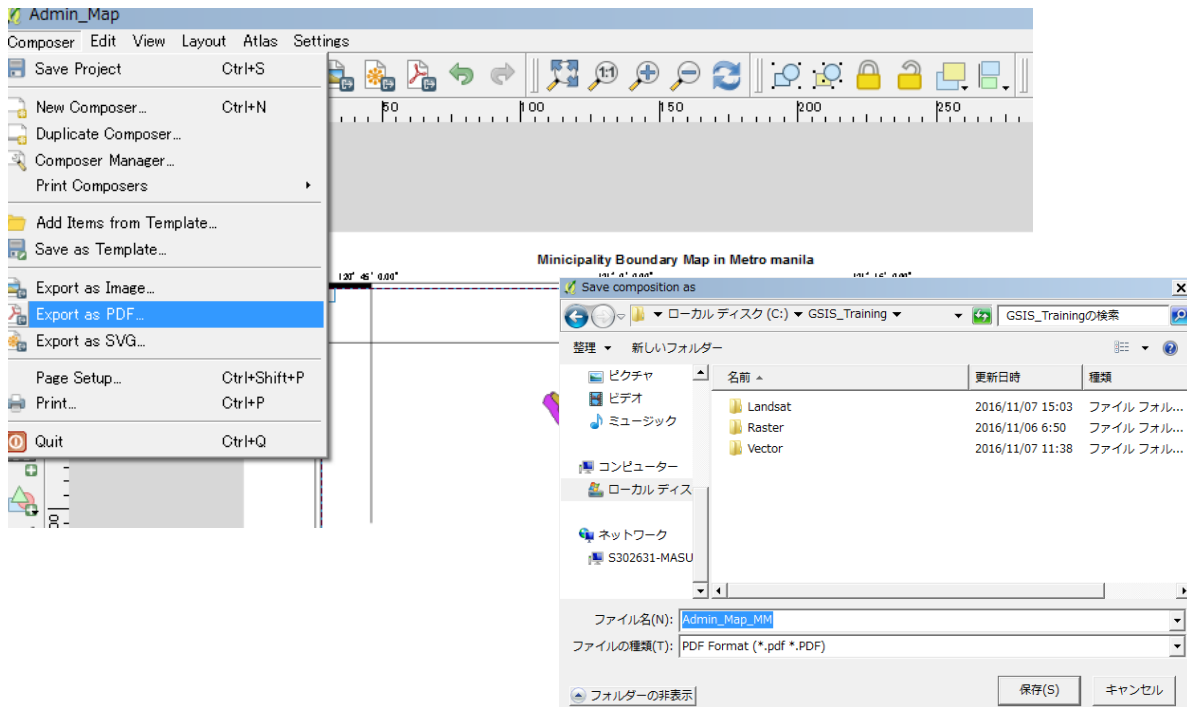
Finally make sure your exported pdf file !
Can you export a map properly?
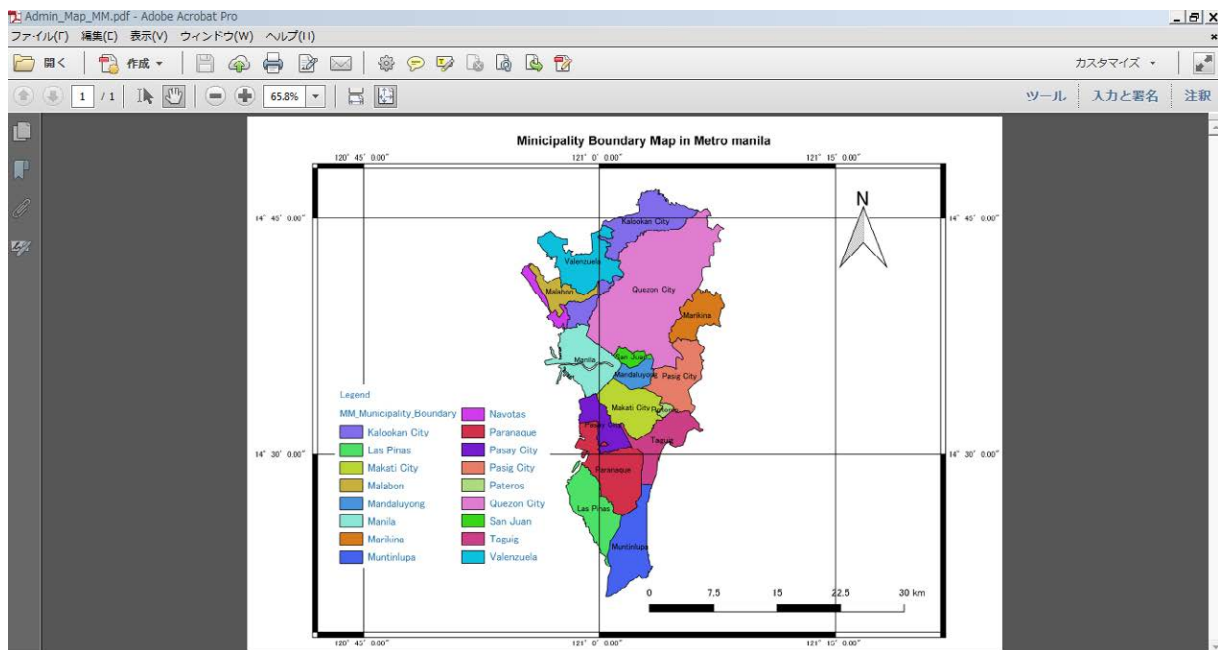
4. Attribute Table Edit

(1)Delete Existing Field
(2)Add New Field
(3)Calculate Area
(4)Calculate Length
(5)Edit Attribute Table (Typing Manually)
(6)Calculate Population Density
(7)Export Attribute Table as DBF file or
    CSV File

Delete Existing Filed

This function is to remove existing fields from the attribute table.

Step 1: Select a target layer and right click > Select "Open Attribute Table"
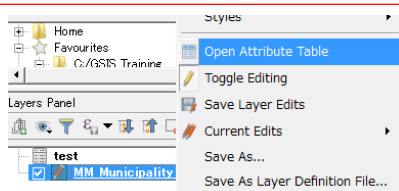
Step 3: Click "Delete field" icon
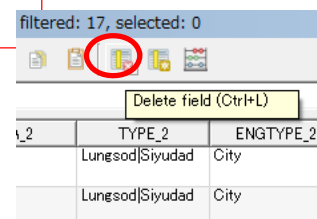
filtered: 17, selected: 0

Delete field (Ctrl+L)

_2	TYPE_2	ENGTYPE_2
	Lungsod|Siyudad	City
	Lungsod|Siyudad	City

Step 2: Click "Toggle editing mode" icon

Toggle editing mode (Ctrl+E)

Step 4: Select a filed and click "OK"

Delete fields

ID_1
NAME_1
ID_2
NAME_2
HASC_2
CCN_2
CCA_2
TYPE_2
ENGTYPE_2
NL_NAME_2
VARNAME_2
Shape_Leng
Shape_Area
District
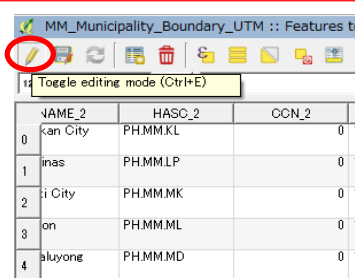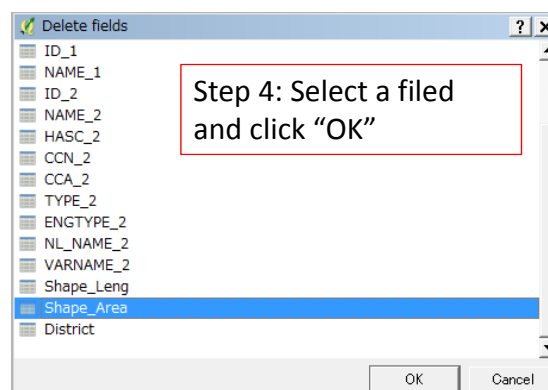
Delete Existing Filed

Step 5: After making sure the removed filed in the attribute table, click again "Toggle editing mode" icon to close edit
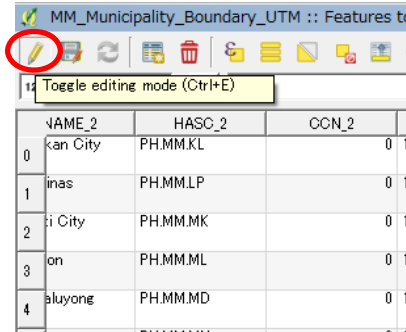
Step 6: If you are OK , click "Save" to finalize the attribute table
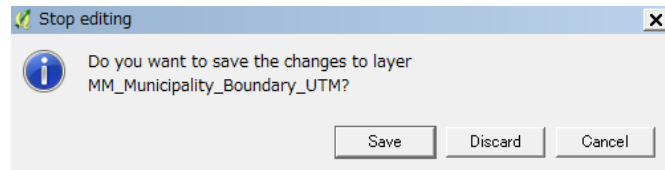
After removing the filed

Add New Field

This function is to add new fields into the existing attribute table.

Step 1: Select a target layer and right click > Select "Open Attribute Table"
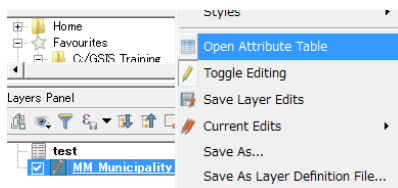
Step 3: Click "New field" icon
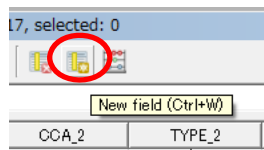
Step 2: Click "Toggle editing mode" icon
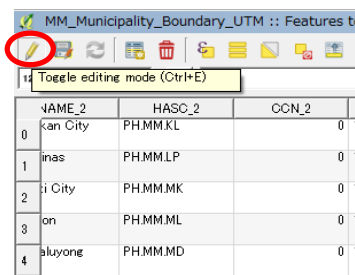
Step 4: Type a new field name, and select the "filed type", and then, set the "Length" & "Precision. Finally the new field can be added in the attribute table
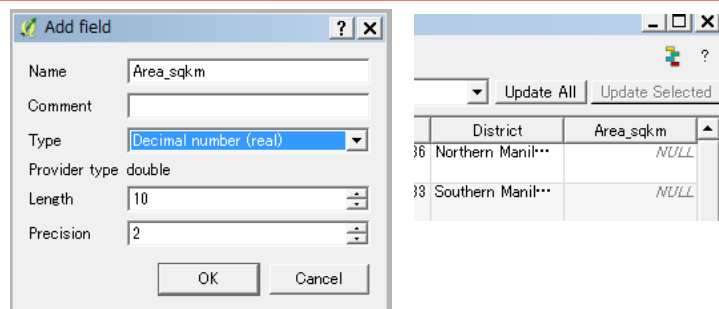
Add New Field

Step 5: After adding the new filed in the attribute table, click again "Toggle editing mode" icon to close edit
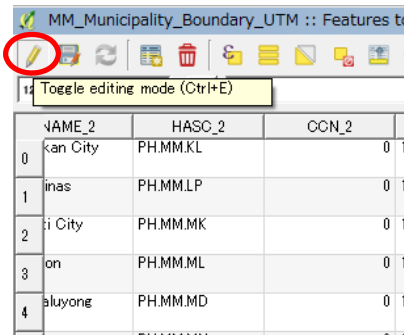
Step 6: If you are OK , click "Save" to finalize the attribute table
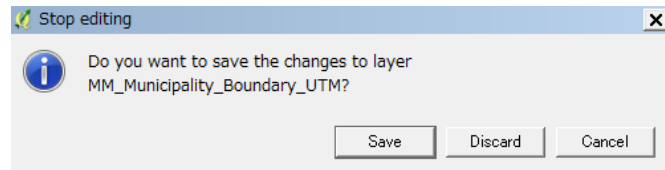
After adding new filed

Added new field
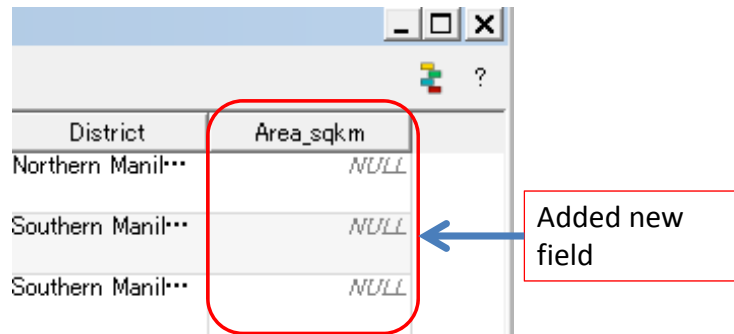
Calculate Area

This function is to calculate area in the attribute table.

Step 1: Select a target layer and right click > Select "Open Attribute Table"
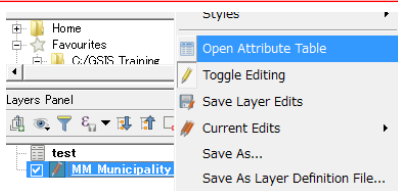
Step 2: Click "Toggle editing mode" icon
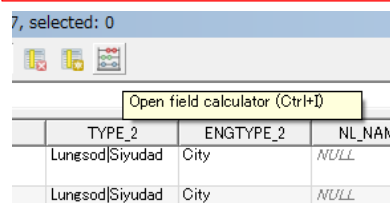
Step 3: Click "Open field culator" icon
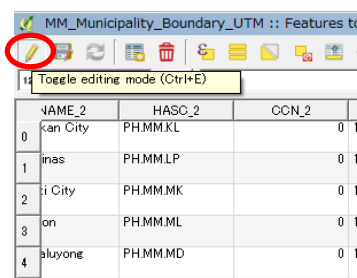
Step 4: Click a box for "Update existing field" and select a target filed named "Area_sqkm" which was created

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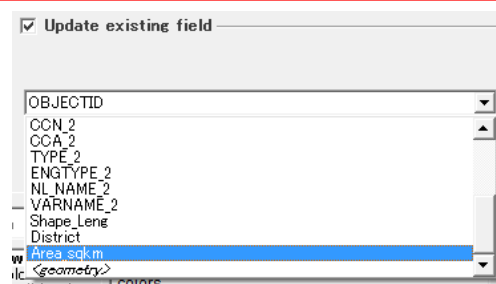
Calculate Area

Step 5: Extract "Geometry" and select $area and double click on the $area

Finally, area of each polygon was calculated

Field calculator

- Only update 0 selected features
- Create a new field
- Create virtual field
- Update existing field

Output field name
Output field type: Whole number (integer)
Output field length: 10   Precision: 0

Expression | Function Editor
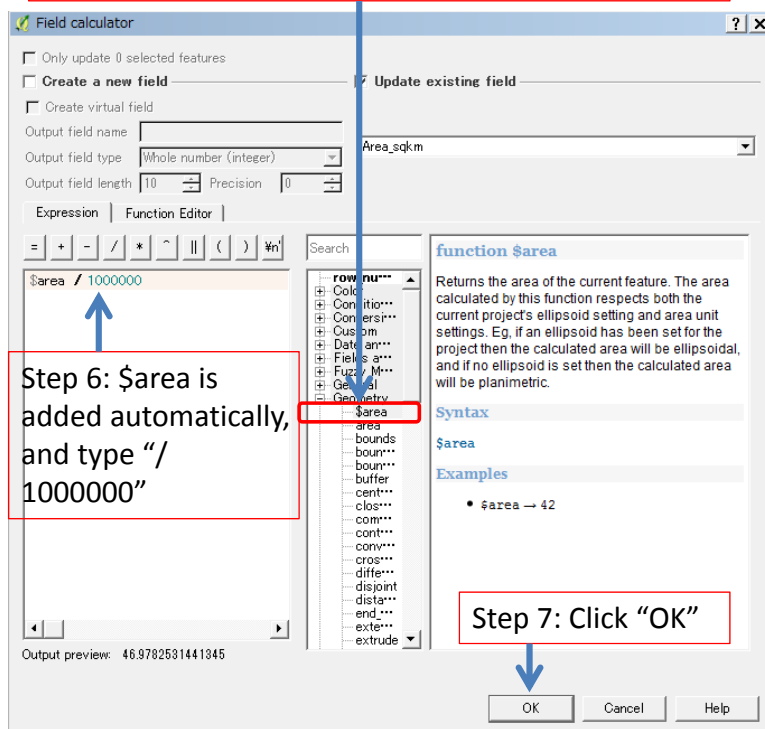
$area / 1000000

Step 6: $area is added automatically, and type "/ 1000000"

Search

- Col…
- Con…ition
- Conversi…
- Cus…om
- Dat… an…
- Fiel…s a…
- Fuz… M…
- Ge…al
- Geometry
  - $area
  - area
  - bounds
  - boun…
  - boun…
  - buffer
  - cent…
  - clos…
  - com…
  - cont…
  - conv…
  - cros…
  - diffe…
  - disjoint
  - dista…
  - end…
  - exte…
  - extrude

function $area

Returns the area of the current feature. The area calculated by this function respects both the current project's ellipsoid setting and area unit settings. Eg, if an ellipsoid has been set for the project then the calculated area will be ellipsoidal, and if no ellipsoid is set then the calculated area will be planimetric.

Syntax

$area

Examples

- $area → 42

Step 7: Click "OK"

Output preview: 46.9782531441345

OK   Cancel   Help

Area_sqkm
46.98
33.19
31.76
14.61
10.95
36.68
22.15
38.52
7.87
44.18
18.68
31.56
1.96
147.96

Calculate Length

This function is to calculate length in the attribute table.

Step 1: Select a target layer and right click > Select "Open Attribute Table"

- Home
- Favourites
- C:/GSIS Training

Layers Panel

test
☑ MM_Municipality

Styles
- Open Attribute Table
- Toggle Editing
- Save Layer Edits
- Current Edits
- Save As...
- Save As Layer Definition File...

Step 2: Click "Toggle editing mode" icon

MM_Municipality_Boundary_UTM :: Features to

Toggle editing mode (Ctrl+E)

	NAME_2	HASC_2	CCN_2
0	kan City	PH.MM.KL	0
1	inas	PH.MM.LP	0
2	ti City	PH.MM.MK	0
3	on	PH.MM.ML	0
4	aluyong	PH.MM.MD	0

Step 3: Click "Open field culator" icon

7, selected: 0

Open field calculator (Ctrl+I)

TYPE_2	ENGTYPE_2	NL_NAM
Lungsod|Siyudad	City	NULL
Lungsod|Siyudad	City	NULL

Step 4: Click a box for "Update existing field" and select a target filed named "Shape_Leng"

☑ Update existing field

Shape_Leng

- CCN_2
- CCA_2
- TYPE_2
- ENGTYPE_2
- NL_NAME_2
- VARNAME_2
- Shape_Leng
- District
- Area_sqkm
- <geometry>
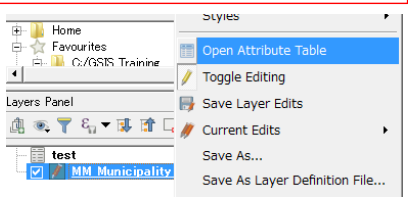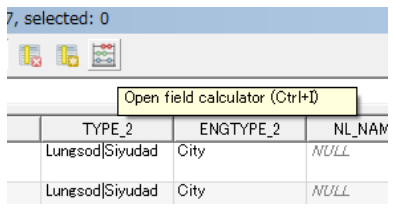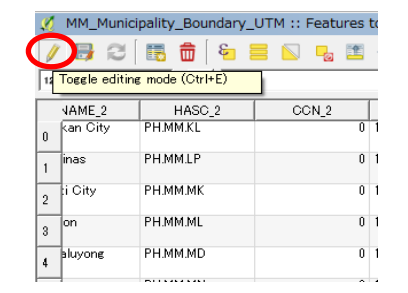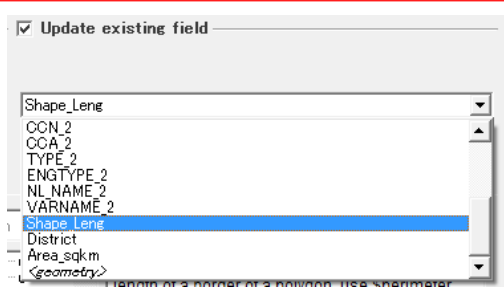
Calculate Length

Step 5: Extract "Geometry" and select $perimeter and double click on the $length

Finally, perimeter of each polygon was calculated

Step 6: $perimeter is added automatically, and type "/ 1000"

Step 7: Click "OK"

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Edit Attribute Table (Typing Manually)

This function is to edit the attribute table manually. Here we add the population information by hand

Step 1: Select a target layer and right click > Select "Open Attribute Table"

Step 3: Click "New field" icon

Step 2: Click "Toggle editing mode" icon

Step 4: Type a new field name " Population" and select the "filed type" as "Whole umber (integer)", and then, set the "Length" as "10" then click "OK". Finally the new field can be added in the attribute table

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Edit Attribute Table (Typing Manually)

Step 5: Select a target population of city in Excel and right click, select "Copy"

Step 7: After entering all values in the attribute table, click again "Toggle editing mode" icon to close edit

Step 6: Move to QGIS, double click on the "NULL" for the target city, and then right click, select "Paste" and Enter"
Continue to enter all of the number of population

Step 8: If you are OK , click "Save" to finalize the attribute table

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Calculate Population Density (Exercise)

You have data on "Area" and "Population" in the attribute table now. Please calculate "Population Density" and create "Map of Population Density with map elements.

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Export Attribute Table as DBF or CSV File

Step 1: Select layer and right click, select "Save as"

Step 2: Change "Format" to DBF file
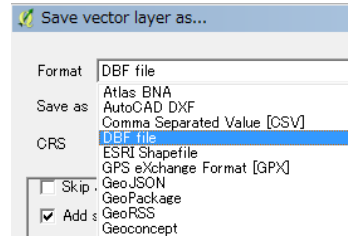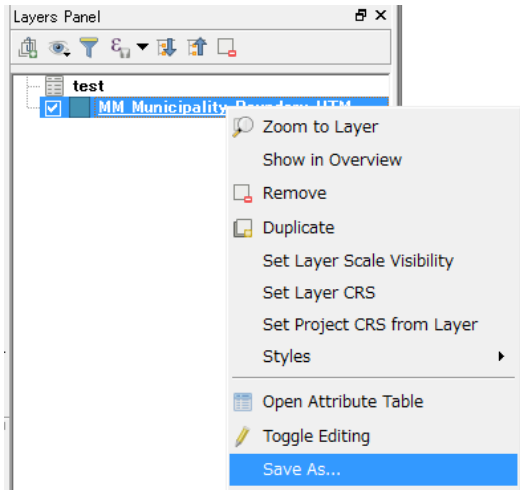
Step 3: Typing "Output file name"
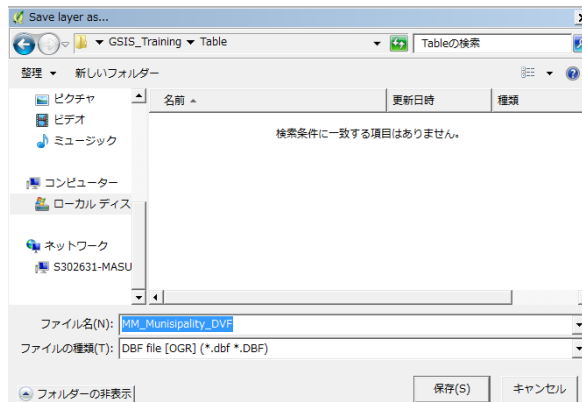
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Export Attribute Table as DBF or CSV File

Step 4: Make sure "Format", "Save as" again, and then finally click OK"

Step 5: Start Excel > Open file and change format, select *.DBF
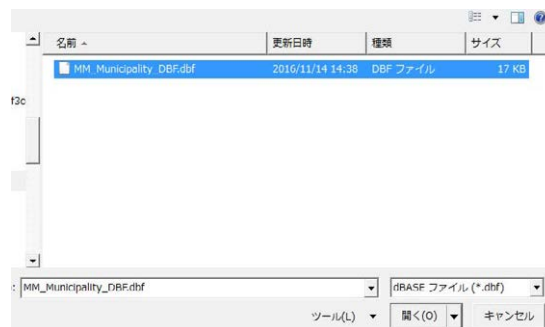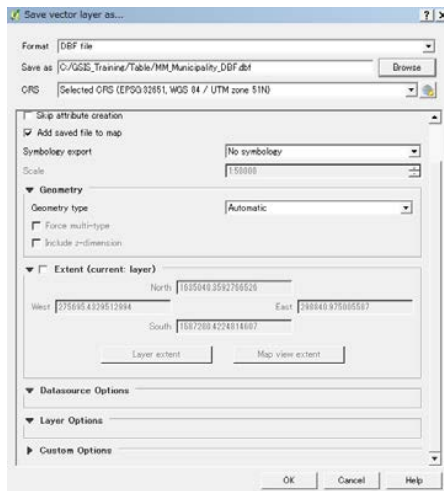
Step 6: Finally, you can open the QGIS attribute table in MS Excel
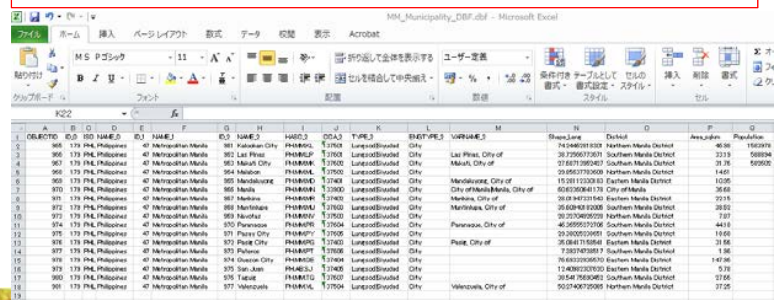
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5. Spatial Edit Functions

INPUT

+
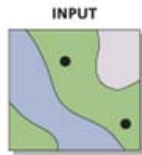
CLIP FEATURE

OUTPUT

(1)Clip
(2)Buffer

Clip Function

INPUT

+
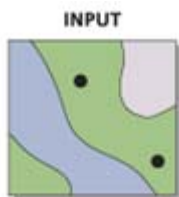
CLIP FEATURE

OUTPUT

- Extracts input feature by the overlaid clip feature
- For instance, using this function, distribution map of schools by each municipality area can be produced.

Clip Function

Step 1: Display school distribution data and municipality area

Step 2: Main menu > Vector > Geoprocessing Tools > "Clip…"

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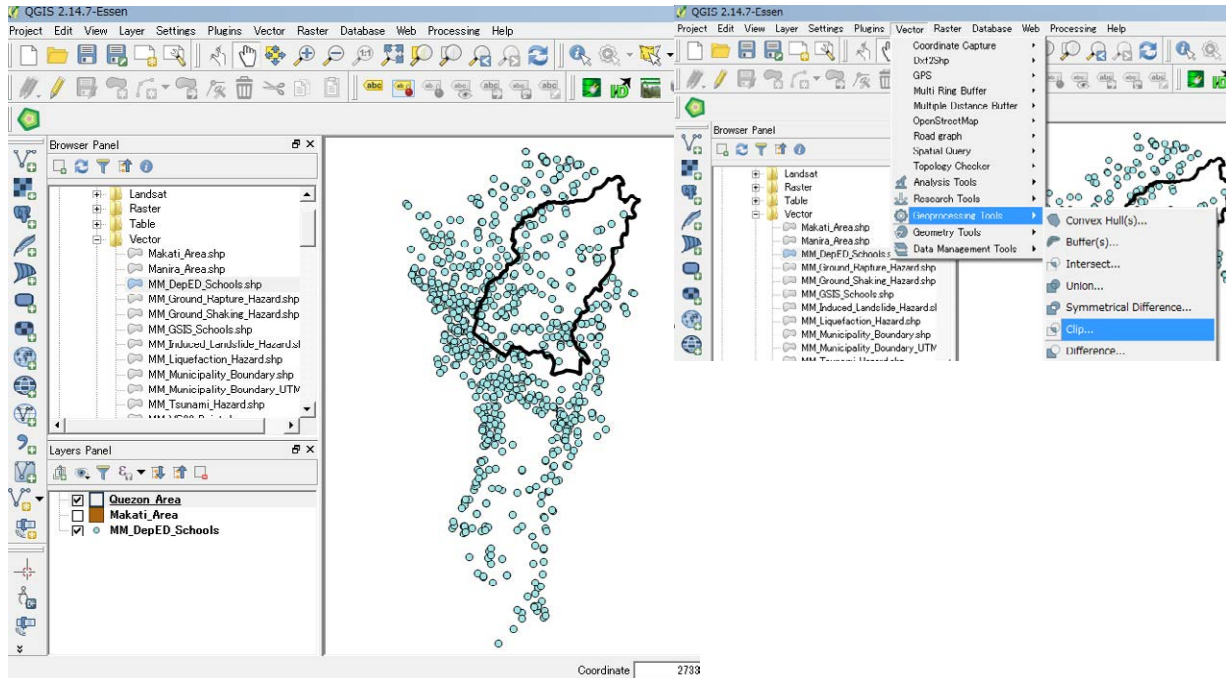
Clip Function

Step 3: Select input layer "MM_DepED_Schools" > Select clip payer "Quezon_Area" > and type "Output shapefime"

Step 2: Finally, distribution schools data in Quezon city is generated.

KOKUSAI KOGYO CO., LTD.
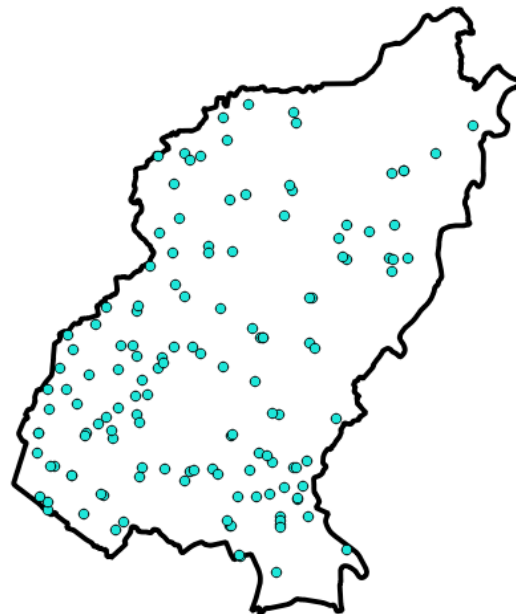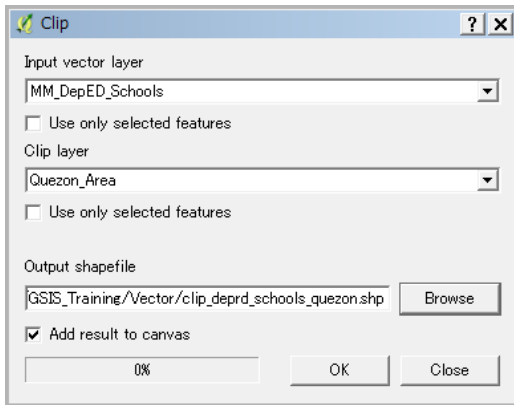
Buffer Function

- This functions is to generate buffer zone from features, such as points, lines, and polygons
- This function is effective to understand the spatial relationship between feature and feature

Buffer Zone from Hospital

KOKUSAI KOGYO CO., LTD.
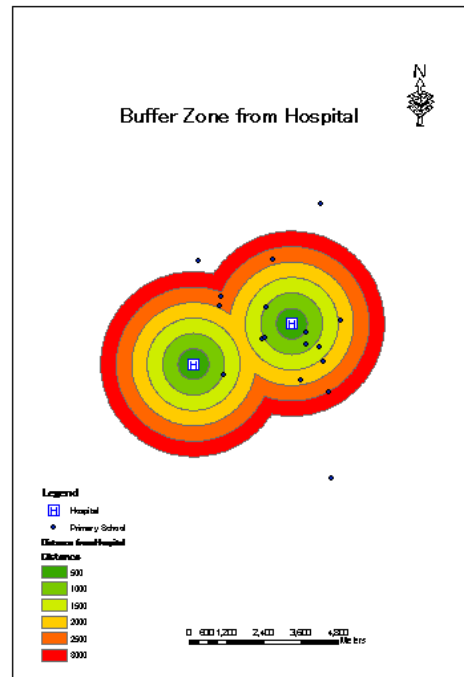
Buffer Function

Step 1: Display line data
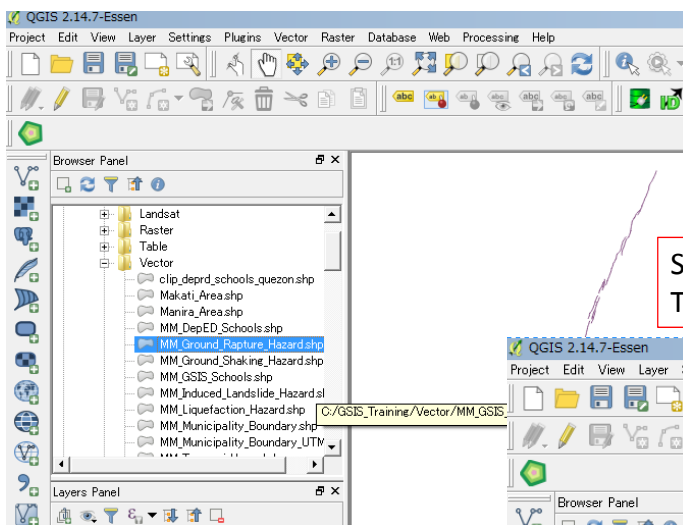
Step 2: Click "Vector" > "Geoprocessing Tools" > "Buffer (s)"

KOKUSAI KOGYO CO., LTD.
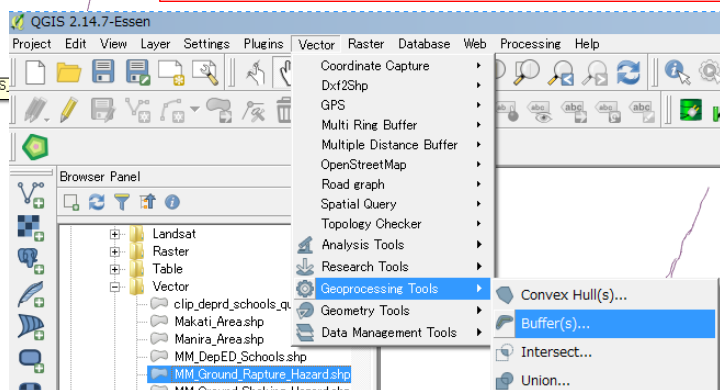
Buffer Function

Step 3: Select "Input vector layer",
Enter "Buffer distance
And type "Output shapefile.
Finally, click "OK"

Created Buffer Zones

KOKUSAI KOGYO CO., LTD.
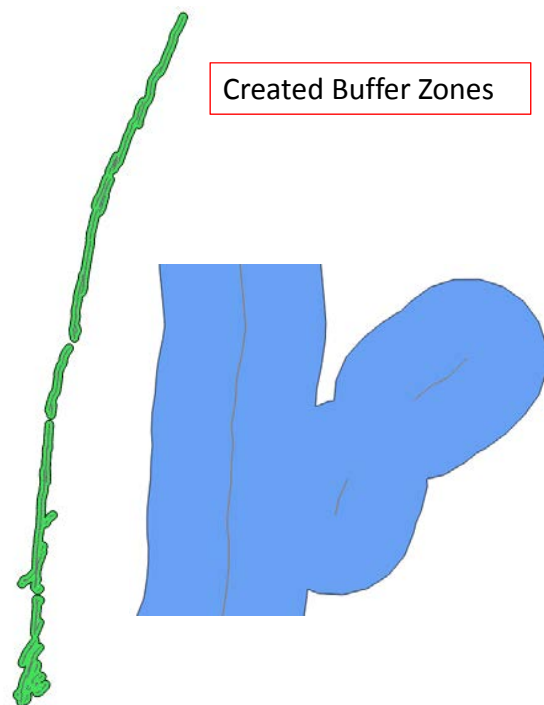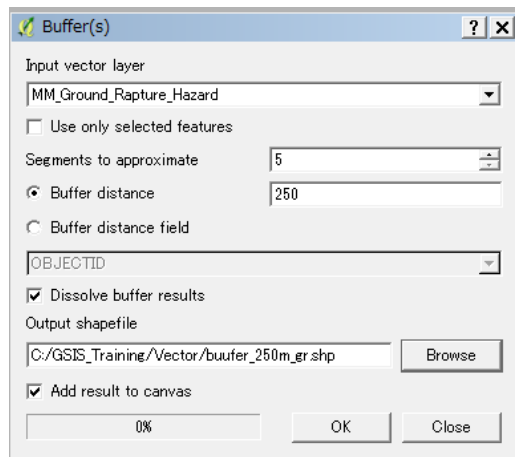
Exercise for Clip and Buffer

- Please create buffer zones (2km distance) from DepED Schools

- Please find put the schools which are distributing within 1 km distance from ground rapture (fault).

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Conclusion (1)

- QGIS Open Source Software is a powerful tools as well as nonfree ArcGIS
- Several kinds of data type can be handled in QGIS
  - Vector (Point, Line and Polygon)
  - Raster (Images, Scanned data etc.)
  - Tabular (CSV file, DBF file etc.)
- There are two (2) typical map coordinate system
  - Geographic Coordinate System
  - Projected (UTM) Coordinate System

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Conclusion (2)

- It is extremely easy to create a final map with map elements
  - Map Title
  - North Arrow
  - Legend
  - Scale Bar
  - Grid Lines
- There are some kinds of data display methods
  - Single Color
  - Categorized Color
  - Graduated Color
- Using attribute table function, it can be possible for us to edit, calculate attribute data.
- There are basic spatial functions in QGIS, such as "Clip", "Buffer" etc.

If you are interested in GIS, please use it every day.
It's a shortcut to learn GIS !

KOKUSAI KOGYO CO., LTD.

巻末資料 4 ： 質問票

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit _____   Name _____

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	5

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3	4	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	3	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	4	5

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-2: How do you think of the provided QGIS operation manual?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-3: Did you understand how to convert the map coordinate system in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-4: Did you understand how to display GIS data properly in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-5: Did you understand how to make a map layout in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-6: Did you understand how to edit attribute table in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Comment (if any)

Thank you very much for your kind cooperation

JICA Study Team

巻末資料 5 ： 質問票回答

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit ____11 - GSIS____ Name ____CARl ORDONA____

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2 -	3	4	5

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3	4	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	3	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	4	5

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-2: How do you think of the provided QGIS operation manual?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-3: Did you understand how to convert the map coordinate system in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-4: Did you understand how to display GIS data properly in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-5: Did you understand how to make a map layout in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-6: Did you understand how to edit attribute table in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Comment (if any)

Thank you for facilitating us.

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit ___INFORMATION Security___ Name ___Homer Mabugri___
OFFICE

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	(5)

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	(4)	5

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q2-2: How do you think of the provided QGIS operation manual?

Poor		Moderate		Excellent
1	2	3	4	(5)

Q2-3: Did you understand how to convert the map coordinate system in QGIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q2-4: Did you understand how to display GIS data properly in QGIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q2-5: Did you understand how to make a map layout in QGIS?

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1	2	3	(4)	5

Q2-6: Did you understand how to edit attribute table in QGIS?

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1	2	3	(4)	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Comment (if any)

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit _ACTUARIAL & RISK Mgmt Group_   Name _MARCELINA C. NATIVIDAD_

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	(5)

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	(4)	5

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Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
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1	2	3	(4)	5

Q2-3: Did you understand how to convert the map coordinate system in QGIS?

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1	2	3	4	(5)

Q2-6: Did you understand how to edit attribute table in QGIS?

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1	2	3	4	(5)

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Comment (if any)

Hopefully next time there will be more exercises on how to use the INSURANCE PREMIUM TOOL. Also, it would be better if there was a manual for the SPATIAL ANALYSIC part. Thank you very much for this training!

Thank you very much for your kind cooperation

JICA Study Team

I-86

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit IASC   Name Roselle S. Manejero

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	(5)

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	3	4	(5)

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	4	(5)

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

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Poor		Moderate		Excellent
1	2	3	4	(5)

Q2-6: Did you understand how to edit attribute table in QGIS?

Poor		Moderate		Excellent
1	2	3	4	(5)

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	4	(5)

Comment (if any)

Highly recommended

Thank you very much for your kind cooperation

JICA Study Team

I-87

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit ___IASO___   Name ___Jocelyn G. Sande___

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	(5)

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q1-3: Did you understand how to operate insurance premium tool?

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Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
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2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

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1	2	3	4	(5)

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	4	(5)

Comment (if any)

Highly recommended

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit _Claims Dept. - 16_   Name _Evelyn Santos_

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	(5)

Q1-2: Did you understand what kinds of data are stored in this tools?

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1	2	3	(4)	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Comment (if any)

Very informative. the speaker / team are helpful and approachable.

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit _CLAIMS DEPT._ Name _ALBERT PAUL DELA MERCED_

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	(4)	5

Q1-2: Did you understand what kinds of data are stored in this tools?

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1	2	3	(4)	5

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Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Comment (if any)

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit   UND - 1G   Name   BerNard   Christian   Untalan

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

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Poor		Moderate		Excellent
1	2	3	4	(5)

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

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1	2	3	(4)	5

Q2-2: How do you think of the provided QGIS operation manual?

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Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Comment (if any)

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit PRMSU   Name Elma S. Aggarao

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	(4)	5

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1	2	(3)	4	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Comment (if any)

Very technical yet, if it will be applied to GSIS it would be very useful tool

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit FMAD - CONTROLLER   Name BERNADETTE R. RODRIGUEZ

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	(4)	5

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Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Comment (if any)

Very informative and a new learning for me. The speakers/resource persons are good.

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit ___Controller___   Name ___Emily Besid___

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
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Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Comment (if any)

The application is
Very useful for insurance companies and gov't agencies
JICA Study Team is very good!

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit INSURANCE GRUUP Name MARVIN CRIS A. CONCEPCION

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	(5)

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	(3)	4	5

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1	2	(3)	4	5

Comment (if any)

MORE HANDS ON TRAINING TO MASTER THIS TOUL

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit UNDERWRITING DEPT. INSURANCE GROUP   Name MICHAEL ANTONIO B. GUILLERMO

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	(5)

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	(4)	5

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-2: How do you think of the provided QGIS operation manual?

Poor		Moderate		Excellent
1	2	3	4	(5)

Q2-3: Did you understand how to convert the map coordinate system in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-4: Did you understand how to display GIS data properly in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-5: Did you understand how to make a map layout in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-6: Did you understand how to edit attribute table in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Comment (if any)

MORE HANDS-ON TRAINING, MORE TRAININGS TO COME

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit __UNDERWRITING DEPT__ Name __PATRICIO B. BONAGUA, Jr.__

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	5 ✓

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3 ✓	4	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	3 ✓	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	4 ✓	5

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	3	4 ✓	5

Q2-2: How do you think of the provided QGIS operation manual?

Poor		Moderate		Excellent
1	2	3	4	5 ✓

Q2-3: Did you understand how to convert the map coordinate system in QGIS?

Poor		Moderate		Excellent
1	2	3 ✓	4	5

Q2-4: Did you understand how to display GIS data properly in QGIS?

Poor		Moderate		Excellent
1	2	3	4 ✓	5

Q2-5: Did you understand how to make a map layout in QGIS?

Poor		Moderate		Excellent
1	2	3	4 ✓	5

Q2-6: Did you understand how to edit attribute table in QGIS?

Poor		Moderate		Excellent
1	2	3	4 ✓	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	4 ✓	5

Comment (if any)

MORE TRAINING'S COMING FROM JICA STUDY TEAM
SO WE CAN LEARN MORE.

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit _Underwriting Dept._ Name ___Sheila S. Rivera___

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	5

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3	4	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	3	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	4	5

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-2: How do you think of the provided QGIS operation manual?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-3: Did you understand how to convert the map coordinate system in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-4: Did you understand how to display GIS data properly in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-5: Did you understand how to make a map layout in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-6: Did you understand how to edit attribute table in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Comment (if any)

Another round training please.

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit _Marketing. Insurance Grou_ Name _Filipina A. Borreta_

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	(3)	4	5

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3	4	(5)

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	4	(5)

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q2-2: How do you think of the provided QGIS operation manual?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-3: Did you understand how to convert the map coordinate system in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-4: Did you understand how to display GIS data properly in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-5: Did you understand how to make a map layout in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-6: Did you understand how to edit attribute table in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Comment (if any)

We need another round of training, to
include the gathering of data

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit ___Insurance Group___ Name ___TRISTAN HERNANDEZ___

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	(5)

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	4	(5)

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q2-2: How do you think of the provided QGIS operation manual?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-3: Did you understand how to convert the map coordinate system in QGIS?

Poor		Moderate		Excellent
1	2	3	(4)	5

Q2-4: Did you understand how to display GIS data properly in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-5: Did you understand how to make a map layout in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-6: Did you understand how to edit attribute table in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	(3)	4	5

Comment (if any)

Continuous training if there are updates.

Thank you very much for your kind cooperation

JICA Study Team

Questionnaire on the training for Risk Based Pricing Tools with QGIS

Unit _____OVP- MUCO_____ Name _____EUGENE O. DAVID_____

Thank you very much for participating the training on Risk Based Pricing Tools & QGIS
JICA Study Team would like to evaluate the results of the training basted on your answers
Please evaluate following questions

1. Risk Based Pricing Tools

Q1-1: Did you understand why GSIS need insurance premium calculation tool?

Poor		Moderate		Enough
1	2	3	4	5

Q1-2: Did you understand what kinds of data are stored in this tools?

Poor		Moderate		Excellent
1	2	3	4	5

Q1-3: Did you understand how to operate insurance premium tool?

Poor		Moderate		Excellent
1	2	3	4	5

Q1-4: Did you enjoy the premium tool operation?

Poor		Moderate		Excellent
1	2	3	4	5

2. Basic Training on QGIS

Q2-1: Did you acquire the basic knowledge on GIS?

Poor		Moderate		Excellent
1	2	3	4	5

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1	2	3	4	5

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1	2	3	4	5

Q2-4: Did you understand how to display GIS data properly in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-5: Did you understand how to make a map layout in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-6: Did you understand how to edit attribute table in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Q2-7: Did you understand how to analyze using spatial function (Clip, Buffer etc.) in QGIS?

Poor		Moderate		Excellent
1	2	3	4	5

Comment (if any)

Thank you very much for your kind cooperation

JICA Study Team

I-101

ANNEX J 既存の学校の災害リスク評価手法

1　既存の学校の耐震評価手法

既存の建物に対する耐震評価手法については、様々な手法が提案されているが、フィリピン国においては、アメリカの FEMA[1]の手法が多く採用されている。評価ガイドラインについては、1980 年代から整備されてきたが、フィリピンの学校の設計、建設を管理している DPWH によると、FEAM-P154 の、Rapid Visual Screenings[2]を用いて評価していることが判明した [3]。そこで、ここではその手法について概略を示す。

a.　Rapid Visual Screening（RVS）の概要

RVS は、建築物の耐震性能における初期段階での脆弱性を評価する手法である。RVS によって、脆弱であると評価された建築物に対しては、耐震設計の専門家によってさらに詳しく調査する必要がある。なぜならこの手法は、数多くの対象建築物を、多くのコストをかけずに評価する手法として開発されたからである。その結果として詳細調査が必要な建築物の数量を削減する結果となる。さらにこの RVS では、建築物の中に入る必要はなく評価ができるように設計されている。

この評価手法によると、1 件の評価に係る時間は、20 分～30 分であり、非構造物である内装部材などに関しては評価できないことに対して注意すべきであるが、逆にこの手法によって脆弱であると評価された建築物の評価は妥当である可能性が高い。

この手法は、目視による調査と、データ収集フォームへの記入から構成されている。データ収集フォームには、建築物のスケッチや写真とともに、地震に対するリスク評価にかかわるデータを記載する。

FEMA ハンドブックでは、このデータ収集フォーム記入にかかわる手順を示しており、記入者は、ある程度の建築に関する知識があれば、耐震設計の専門家でなくとも記入できるように設計されている。このフォーム記入により、顕著な耐震性に関する欠陥を認識し、ハザードランク 1~6 の数字で評価することができる。

この手法によって評価した建築物は、人的な安全性につき許容できる建築物と、耐震性能に問題がありさらに詳しく調査が必要な建築物の 2 種に分類され、FEMA ハンドブックでは、評価結果が 2.0 点 [4]以下の場合は、耐震性能に問題のある建築物という評価基準を示唆している。

b.　評価シート

評価シートの例を以下に示す。評価シートは、Level 1 と Level 2 の 2 種類があり、通常の調査は Level 1 のみ実施し、Level 1 で脆弱であると判断し、さらに詳細な調査が必要な場合は、Level 2 の評価も行うこととなっているが、調査期間や予算によっては省略することもある。基本的には、Level 1 の評価点に対し、Level 2 の評価項目（建物形状、構造、補強の有無など）に従って評価点を加点、減点する設計になっている。

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[1] FEMA: http://www.fema.gov/　アメリカ連邦緊急事態管理庁
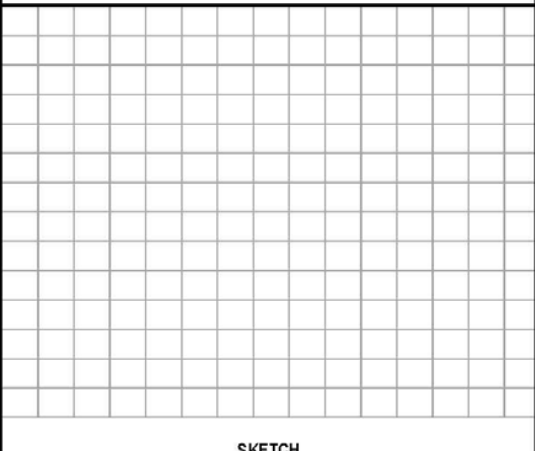[2] http://www.fema.gov/media-library/assets/documents/15212
[3] 2016年4月13日、DPWH聞き取り調査結果
[4] FEMA P154では、評価点2.0点は、与えられた加速度応答スペクトルの条件下で、建築物が崩壊（Collapse）する確率が、1 in 10^2=百分の一と規定している。

表 1-1 ：Level 1 データ収集シート（地震危険（High Seismicity Area）地域用）

Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1
HIGH Seismicity

PHOTOGRAPH

Address: _____
_____ Zip: _____

Other Identifiers: _____
Building Name: _____
Use: _____
Latitude: _____ Longitude: _____
S_S: _____ S_1: _____
Screener(s): _____ Date/Time: _____

No. Stories: Above Grade: ____ Below Grade: ____ Year Built: ____ ☐ EST
Total Floor Area (sq. ft.): _____ Code Year: _____
Additions: ☐ None ☐ Yes, Year(s) Built: _____

Occupancy: Assembly · Commercial · Emer. Services ☐ Historic ☐ Shelter
Industrial · Office · School ☐ Government
Utility · Warehouse · Residential, #Units: _____

Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☐E Soft Soil ☐F Poor Soil · DNK If DNK, assume Type D.

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

Irregularities: ☐ Vertical (type/severity) _____
☐ Plan (type)

Exterior Falling Hazards:
☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer
☐ Parapets ☐ Appendages
☐ Other: _____

COMMENTS:

SKETCH
☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE	Do Not Know	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score		3.6	3.2	2.9	2.1	2.0	2.6	2.0	1.7	1.5	2.0	1.2	1.6	1.4	1.7	1.7	1.0	1.5
Severe Vertical Irregularity, V_{L1}		-1.2	-1.2	-1.2	-1.0	-1.0	-1.1	-1.0	-0.8	-0.9	-1.0	-0.7	-1.0	-0.9	-0.9	-0.9	-0.7	NA
Moderate Vertical Irregularity, V_{L1}		-0.7	-0.7	-0.7	-0.6	-0.6	-0.7	-0.6	-0.5	-0.5	-0.6	-0.4	-0.6	-0.5	-0.5	-0.5	-0.4	NA
Plan Irregularity, P_{L1}		-1.1	-1.0	-1.0	-0.8	-0.7	-0.8	-0.7	-0.6	-0.6	-0.8	-0.5	-0.7	-0.6	-0.7	-0.7	-0.4	NA
Pre-Code		-1.1	-1.0	-0.9	-0.6	-0.6	-0.8	-0.6	-0.2	-0.4	-0.7	-0.1	-0.5	-0.3	-0.5	-0.5	0.0	-0.1
Post-Benchmark		1.6	1.9	2.2	1.4	1.4	1.1	1.9	NA	1.9	2.1	NA	2.0	2.4	2.1	2.1	NA	1.2
Soil Type A or B		0.1	0.3	0.5	0.4	0.6	0.1	0.6	0.5	0.4	0.5	0.3	0.6	0.4	0.5	0.5	0.3	0.3
Soil Type E (1-3 stories)		0.2	0.2	0.1	-0.2	-0.4	0.2	-0.1	-0.4	0.0	0.0	-0.2	-0.3	-0.1	-0.1	-0.1	-0.2	-0.4
Soil Type E (> 3 stories)		-0.3	-0.6	-0.9	-0.6	-0.6	NA	-0.6	-0.4	-0.5	-0.7	-0.3	NA	-0.4	-0.5	-0.6	-0.2	NA
Minimum Score, S_{MIN}		1.1	0.9	0.7	0.5	0.5	0.6	0.5	0.5	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.2	1.0

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$:

EXTENT OF REVIEW
Exterior: ☐ Partial ☐ All Sides ☐ Aerial
Interior: ☐ None ☐ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☐ No
Soil Type Source: _____
Geologic Hazards Source: _____
Contact Person: _____

LEVEL 2 SCREENING PERFORMED?
☐ Yes, Final Level 2 Score, S_{L2} _____ ☐ No
Nonstructural hazards? ☐ Yes ☐ No

OTHER HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?
☐ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage/deterioration to the structural system

ACTION REQUIRED
Detailed Structural Evaluation Required?
☐ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended? (check one)
☐ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame · RC = Reinforced concrete · URM INF = Unreinforced masonry infill · MH = Manufactured Housing · FD = Flexible diaphragm
BR = Braced frame · SW = Shear wall · TU = Tilt up · LM = Light metal · RD = Rigid diaphragm

表 1-2 Level2 データ収集シート（地震危険（High Seismicity Area）地域用）

Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 2 (Optional) HIGH Seismicity

Optional Level 2 data collection to be performed by a civil or structural engineering professional, architect, or graduate student with background in seismic evaluation or design of buildings.

Bldg Name:	Final Level 1 Score:	$S_{L1} =$	(do not consider S_{MIN})
Screener:	Level 1 Irregularity Modifiers:	Vertical Irregularity, $V_{L1} =$	Plan Irregularity, $P_{L1} =$
Date/Time:	ADJUSTED BASELINE SCORE:	$S' = (S_{L1} - V_{L1} - P_{L1}) =$	

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic		Statement (If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)	Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.2	
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story (circle one maximum)	W1 building cripple wall: An unbraced cripple wall is visible in the crawl space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.2	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.2	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-0.9	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	-0.5	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	-0.5	
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	$V_{L2} =$ ____
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	-0.5	(Cap at -1.2)
Plan Irregularity, P_{L2}		Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. (Do not include the W1A open front irregularity listed above.)	-0.7	
		Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.	-0.4	
		Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.	-0.4	
		Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.	-0.2	
		C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.	-0.4	$P_{L2} =$ ____
		Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.	-0.7	(Cap at -1.1)
Redundancy		The building has at least two bays of lateral elements on each side of the building in each direction.	+0.3	
Pounding		Building is separated from an adjacent structure by less than 1% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0 (Cap total
			One building is 2 or more stories taller than the other.	-1.0 pounding
			The building is at the end of the block.	-0.5 modifiers at -1.2)
S2 Building		"K" bracing geometry is visible.	-1.0	
C1 Building		Flat plate serves as the beam in the moment frame.	-0.4	
PC1/RM1 Bldg		There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. (Do not combine with post-benchmark or retrofit modifier.)	+0.3	
PC1/RM1 Bldg		The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).	+0.3	
URM		Gable walls are present.	-0.4	
MH		There is a supplemental seismic bracing system provided between the carriage and the ground.	+1.2	
Retrofit		Comprehensive seismic retrofit is visible or known from drawings.	+1.4	$M =$ ____

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: (Transfer to Level 1 form)

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☐ No
If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement (Check "Yes" or "No")	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.			
	There is heavy cladding or heavy veneer.			
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.			
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.			
	There is a sign posted on the building that indicates hazardous materials are present.			
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.			
	Other observed exterior nonstructural falling hazard:			
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.			
	Other observed interior nonstructural falling hazard:			

Estimated Nonstructural Seismic Performance (Check appropriate box and transfer to Level 1 form conclusions)
☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended
☐ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required
☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

c. 評価シートの種類

調査対象建築物が位置する地域の地震特性を以下の通り、5 種類に分類しており、この分類に従って、評価シートを選択する設計となっている。マニラ首都圏は、Zone4 と規定されており、以下の分類の HIGH に属している。

表 1-3 調査対象地の地震特性分類

Seismicity Region	Spectral Acceleration Response, S_S (short-period, or 0.2 seconds)	Spectral Acceleration Response, S_l (long-period, or 1.0 second)
Low (L)	less than 0.250g	less than 0.100g
Moderate (M)	greater than or equal to 0.250g but less than 0.500g	greater than or equal to 0.100g but less than 0.200g
Moderately High (MH)	greater than or equal to 0.500g but less than 1.000g	greater than or equal to 0.200g but less than 0.400g
High (H)	greater than or equal to 1.000g but less than 1.500g	greater than or equal to 0.400g but less than 0.600g
Very High (VH)	Greater than or equal to 1.500g	Greater than or equal to 0.600g

d.　構造物の種別

　基本的には、構造物の種別によって、基準点が異なっている。構造物の種別は、大別して、木造、鋼構造、コンクリート造、プレキャストコンクリート造、石積、プレハブの6種類に分けられ、更に内部以下の通りさらに分類している。

表 1-4 FEMA Building Type

FEMA Building Type	Description
W1	Light wood frame single- or multiple family dwellings of one or more stories in height
W1A	Light wood frame multi-unit, multi-story residential buildings with plan areas on each floor of greater than 3,000 square feet
W2	Wood frame commercial and industrial buildings with floor area larger than 5,000 square feet
S1	Steel moment-resisting frame buildings
S2	Braced steel frame buildings
S3	Light metal buildings
S4	Steel frame buildings with concrete shear walls
S5	Steel frame buildings with unreinforced masonry infill walls
C1	Concrete moment-resisting frame buildings
C2	Concrete shear wall buildings
C3	Concrete frame buildings with unreinforced masonry infill
PC1	Tilt-up buildings
PC2	Precast concrete frame buildings
RM1	Reinforced masonry buildings with flexible floor and roof diaphragms
RM2	Reinforced masonry buildings with rigid floor and roof diaphragms
URM	Unreinforced masonry bearing wall buildings
MH	Manufactured housing

　なお、マニラの小学校の構造は、鉄筋コンクリートの柱、ビーム、スラブ構造で、壁はコンクリートブロックもしくは、レンガ積であり、TYPE C1 となっている。
　なお、構造物の種別については、フィリピン独自の以下の分類[5]があり、オーストラリア政

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[5] Development of Heuristic Seismic Vulnerability Curves of Key Building Types in the Philippines：

府等の支援で実施された GMMARAP（Great Metro Manila Area Risk Analysis Project）において、この分類に従って建築物の脆弱性評価が実施されている。コンクリート構造、鋼構造の建築物については、上記の FEMA の分類と同等であるとしている。

<div align="center">

表 1-5 フィリピンにおける構造物 Type の分類と建設年

</div>

Material	Type	Sub-type	Structural Type or Description	Year of Construction Pre-1972	Year of Construction 1972-1992	Year of Construction Post-1992
WOOD	W1*	W1-L	Wood frame with area ≤ 500 sq.m. (1-2		√	
WOOD	W3	W3-L	Bamboo (1-2 storeys)		√	
WOOD	N	N-L	Makeshift (1-2 storeys)		√	
MASONRY	CHB	CHB-L	Concrete hollow blocks (1-2 storeys)		√	
MASONRY	URM*	URM-L	Unreinforced masonry (1-2 storeys)		√	
CONCRETE	C1*	C1-L	Concrete moment frame (1-2 storeys)		√	
CONCRETE	C1*	C1-M	Concrete moment frame (3-7 storeys)	√	√	√
STEEL	S1*	S1-L	Steel moment frame (1-2 storeys)	√	√	√
STEEL	S1*	S1-M	Steel moment frame (3-7 storeys)	√	√	√

上記＊印のつく Type については、FEMA HAZUZ と同等と規定。

e. 評価シートへの記入項目

現地調査に先立ち、以下の項目に関する情報をできるだけ集め、評価シートに記載しておく。図面等が入手できれば、評価は短時間で済むが、入手困難な場合は、現地にて目視にて確認できる評価項目となっている。

- 建物名、住所、用途、階数と高さ、総床面積、建築年、建物構造
- 土質情報：5 段階（A:Hard Rock、B:Average Rock, C:Dense Soil, D:Stiff Soil, E:Soft Soil, F:Poor Soil）
- 現地調査：現地調査においては、事前に集められなかった情報を、目視にて確認記入する。

f. 評価方法

基本的には、建築物のタイプによって基本点が決定し、その後建築物の立面形状、平面形状、建築基準、土質タイプによって、基本点から加減算し、総合点を出すように設計されている。建物タイプ C1（コンクリート柱・ビーム、ブリック積み壁構造）の場合、地域の地震特性が High の場合の基本点ならびに加減算の点数を以下に示す。

<div align="center">

表 1-6 Type C1 建築物の地域地震特性 High の基本点と調整点

</div>

Seismicity Region	H
Basic Score	1.5
Severe Vertical Irregularity	-0.9
Moderate Vertical Irregularity	-0.5
Plan Irregularity	-0.6
Pre-Code	-0.4
Post Benchmark	1.9

Soil type A or B	0.4
Soil Type E (1~3 floor)	0.0
Soil Type E (4 floor and above)	-0.5
Minimum Score	0.3

g. 調整ポイントの内容

調整ポイントの評価は、判定ガイドラインが定められており、それに従って外観の目視によって評価ができるようになっている。以下はその評価項目の概要である。

- Vertical Irregularity（垂直の不規則性）
  建築物が、斜面に建っている、1階が駐車場構造で柱のみの構造、立方体や直方体ではなく、異形な形状である、などの評価項目に従って、Moderate もしくは Severe な Irregularity であると判断した場合は、減算を行う。
- Plan Irregularity（平面の不規則性）
  建築物が平面的に、正方形や長方形でなく、凹凸型の配置の場合は、応力の集中が起こる可能性が高いため減算を行う。
- Pre－Code　（初めて耐震基準が適用される前の建築物）
  フィリピンにおいては、コンクリート構造、鋼構造建築物に対する初めての耐震基準適用年を、1972年と定めている。
- Post Bench Mark（最新の耐震基準が適用された建築物）
  フィリピンにおいては、コンクリート構造、鋼構造建築物に対する最新の耐震基準適用年を、1992年と定めている。
- Soil Type（土質分類）
  土質の分類は、前述のとおり5分類であるが、加算するのは、A,B の岩盤上に立地している場合で、減算するのは、E の軟弱地盤上に立地している場合と定めている。

h. 評価結果の利用

RVS の第一の目的は、地震にたいして潜在的に危険な建築物を確認することであり、必要に応じて、更に詳細な調査を実施することになる。RVS 調査結果は以下の目的にも使用できることを、FEMA P154 Handbook に記載されている。

"developing building-specific seismic vulnerability information for purpose such as **insurance rating,** decision making during ownership transfers, and possible triggering of remodeling requirement during permitting process"

このように、対象地域の対象建築物に対する、保険の各付けにも利用できる可能性があり、今回の簡易保険料率算定のために、簡易に構造物脆弱性を評価するには、適した手法であるといえる。

また DPWH などは、この手法を用いて、既存の学校などの脆弱性評価を行っているという情報があり、これらの結果を活用することは、今後の継続性を担保する上でも、有効な手法となっている。