Solomon Islands Government
Ministry Of Environment, Climate Change, Disaster Management & Meteorology
Post Office Box 21, Honiara, Solomon Islands

Solomon Islands Climate Change Assistance Project (SICAP)

CLIMATE CHANGE DIVISION GEORGRAPHICAL INFORMATION SYSTEM (GIS) DEVELOPMENT

MAY TO SEPTEMBER 2013

FINAL REPORT

Prepared By: **Bryan PITAKIA**
GIS/IT Consultant

Acronyms

SICAP	Solomon Islands Climate Change Assessment Project
MECDM	Ministry of Environment, Climate Change, Disaster Management & Meteorology
CCD	Climate Change Division
GIS	Geographical Information System
ESRI	Environment Systems Research Institute
SEMRICC	Strengthening Environment Management and Reducing the Impact of Climate Change
SOPAC	South Pacific Applied Geoscience Commission
HIE	Household Income and Expenditure
MPA	Marine Protected Area
TNC	Total Nature Conservation
SQL	Structured Query Language
NDMO	National Disaster and Management Office
NGO	Non-Government Organization
GPS	Global Positioning System
DTM	Digital Terrain Model
DEM	Digital Elevation Model
UNDP	United Nation Development Program
MAL	Ministry of Agriculture and Livestock
MOF	Ministry of Finance
MERE	Ministry of Energy and Rural Electrification
MRD	Ministry of Rural Development
LLEE	Live and Learn Environmental Education Solomon Islands
LAN	Local Area Network
RS	Remote Sensing
HCC	Honiara City Council
PS	Permanent Secretary

Acknowledgement

The successful implementation a Geographical Information System (GIS) for Climate Change Division (CCD) of the Ministry Environment, Climate Change, Disaster Management and Meteorology (MECDM) brings a new chapter in mapping the national climate change vulnerability assessment to aid the process of strategic planning to response to challenge of climate change. The establishment of this GIS in this ministry enhances the sustainability of the Governments development and economic reform program through appropriate climate change adaptation and mitigation, and disaster risk reduction policies and build resilience across the country.

Planning, designing and the actual development for the GIS system were done under the guidance of terms of reference and the CCD directors. This report would also like to acknowledge contributions and inputs from different sectors, ministries, institution and individuals by way of providing data, past reports, advices, directions and computer hardware equipment and software etc. Firstly, would like commend the Permanent Secretary (PS) of MECDM, Dr Melchior. Although the PS took office half-way through SICAP GIS development, but has contributed very important statistical data of whole country as well as medical statistical data for Choiseul province. Secondly, to the Director and Deputy of Climate Change division, Doulas Yee and Hudson K and their staffs for supporting the development of this very important tool and the engagement of a local consultant through the SICAP.

Thirdly, to the different government ministries that have been visited and obtain data from, this includes, Ministry of Infrastructure and Development (MID), Ministry of Agriculture and Livestock (MAL), Ministry of Lands and Survey (MLS), Ministry of Mines, Energy and Rural Electrification (MMERE). Ministry of Forestry, Ministry Environment, Climate Change, Disaster Management and Meteorology (MECDM), Statistics division of the Ministry of Finance (MOF), Live and Learn Environmental Education (LLEE), Honiara City Council's (HCC) Health and Medical office, Rural Water Supply and Sanitation (RWSS), Total Nature Conservation (TNC), Save the Children, SOPAC, SEMRICC

CLIMATE CHANGE DIVISION OPERATIONAL GEORGRAPHICAL INFORMATION SYSTEM (GIS)

Background

The Climate Change Division (CCD) of MECDM, through Solomon Islands Climate Change Assistance Project (SICAP), is developing a National Climate Change Vulnerability Assessment of the Solomon Islands. This is in line with the Government's priority to enhance the sustainability of its development and economic reform program through appropriate climate change adaptation and mitigation, and disaster risk reduction policies and to build resilience within the country.

The Climate Change Department through the support of SICAP has taken the first step to develop a national climate change vulnerability assessment through a Geographical Information System (GIS) to enhance strategic planning in response to climate change challenges.

The specific objective of this GIS assignment according to the TOR is to support the ministry in particular the Climate Change Division (CCD) to develop a methodology for a national climate change vulnerability assessment.

The initial contract duration was 45 days however, due to more work still to be done, a request for additional 45 days extension on work was approved by the project. This report covers work done through the 90 days

IMPORTANT: This assignment takes advantage of the existing data and is not intending to undertake field survey for new raw data.

Introduction

One of the major issues in the Solomon Islands today is climate change, Sea level rise, drought, extreme weather events, flood, land degradation and deforestation and diseases, etc. According to Climate Change office at MECDM, the country has adopted 14 global climate models to predict and monitor climate change. However, the ministry is now implementing a major national project to collect and compile local data that will depict the real pattern and effects of climate change in the country.

Now the Solomon Islands Climate Change Assessment Project (SICAP) is supporting CCD to implement a GIS system that captured data already available within different sectors. The system will become a very important tool that performs data analysis and produce a national risk and vulnerability assessment maps. Having this tool will greatly assist MECDM through CCD to perform complex climate change data analysis taking advantage of raster and vector data.
This modern technology and skills on GIS/RS system will enable these sectors to monitor, evaluate, and understand the threats and possible extent of climate/disaster risk in the country. Given the geographical location of Solomon Islands communities, only GIS and RS (Remote Sensing) can make things easier, cost effective, saves time. For example, it will provide the agriculture sectors information required for intervention plan in rural farming system

What is Geographical Information System?

According world leading GIS developer and vendor, ESRI, Mapping geography is one of humanity's most ancient arts, but today it is the cutting edge of information ANALYSIS. Technology enables maps created by GIS help people from many lands and occupations make better DECISIONS for their communities. Whether business, government, education, or science, from the largest enterprise to single worker, GIS offers boundless possibilities.

IMPORTANT: GIS is computer base software program that links WHERE THINGS ARE with WHAT THINGS ARE LIKE. On the other hand flat paper maps WHAT YOU SEE IS WHAT YOU GET, but GIS generated maps have many layers of information for many ways of thinking about a geographic space.

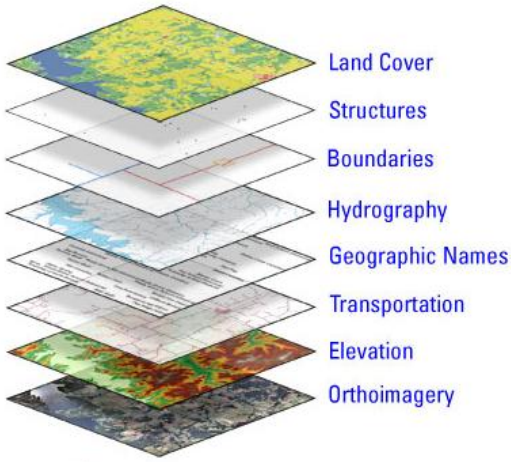

Figure 1 Example of GIS many layers.

DATA RECONNAISSANCE

Within the first two weeks of this SICAP GIS development, reconnaissance on available data among different stakeholders was carried out. This reconnaissance also to identify which organizations has an active GIS system running. These stakeholders visited includes; Ministry Infrastructure and Development (MID), Ministry of Mines Energy, and Rural Electrification (MERE), Ministry of Lands and Surveying (MAL), Ministry of Agriculture and Livestock (MAL), Statistics Division of the Ministry of Finance (MOF), NDMO, Live and Learn Environmental Education Solomon Islands (LLEESI), Honiara City Council Health Centre and Solomon Islands Electricity Authority (SIEA).

Other stakeholders who were later visited after the GIS-workshop are Ministry of Rural Development (MRD), Rural Water Supply and Sanitation (RWSS), Meteorology division of MECDM and TNC.

In addition to data collected from stakeholders stated above, data relating to Vulnerability and Adaptation to climate change captured by previous projects, SEMRICC, UN-Habitat (UNDP Projects), Choiseul Province Climate Change Vulnerability and Adaptation Assessment Report (2013), were also take into consideration.

SICAP GIS Hardware/Software

After visiting the different organizations, it was noted that most common GIS software used are MapInfo Professional and ArcInfo. SICAP GIS setup is currently running in MECDM GIS unit located within the Project Office. MECDM GIS is running MAPINFO v.11 single user License. Both the hardware and software were supplied by UNDP SEMRICC project in 2012. MECDM GIS runs on a standalone desktop computer.

SICAP GIS database will be shifted into the CCD office as soon as the division purchases its new desktop computer. Additional software programs were also installed and used to carry out further analysis on the GIS data. The software includes Global Mapper, Vertical Mapper, MapBasic.

SICAP GIS Database Design

SICAP GIS database is designed to capture vector and raster data under three major categories,

a) Baseline Map

This includes the Solomon Islands topographical map, national administration boundaries (wards, constituencies and provincial boundaries), elevation maps, contour/topography maps, watercourses, forestry inventories, geology, soil map, Infrastructures (bridges, roads, airfields, wharves, marine navigation lights) etc. These data have been sourced from the following; Ministry of Lands and Housing, Ministry of Agriculture and Livestock, Ministry of Forestry, Statistics division of the Ministry of Finance, Ministry of Infrastructure Development and Ministry of Environment, Climate Change, Disaster Management and Meteorology and SOPAC. These raw data are either geo-referenced or non geo-referenced. All data have been checked and loaded into the SICAP GIS system. (See users manual more details).

b) Socio-economic

Includes population data, household income & expenditure (HIE), Solomon Islands settlements, and government facilities (education and health). The latest Socio-economic data available from 2009 national census data sets does not include household population, only summary of population within each ward. However, I managed to get hold of the latest household geo-reference data of the country from the 2009 census without population data. The household data enable the GIS system to run various data analyses to reflecting populations within communities, wards, constituencies, and provinces that are likely to be affected by climate change or are vulnerable to other forms of disaster events.

NOTE: The core of 2009 census data is yet to be officially released therefore it is not possible to access the household population data.

Taking advantage of the MapInfo SQL program, SICAP GIS system can retrieve the total number of households, infrastructure, and government facilities, communities and population (male & female) within a particular ward. It can also identify households, infrastructure, clinics and schools that are constructed below 5-meter contour interval. The system can also as well as identifying these facilities that are located within 20 meters along major rivers. (More SQL results in User manual).

Socio-economic data also includes, MPA data compiled by TNC. These are geo-reference data with every details related to MPA in the country recorded by TNC. Some of MPA activities were also part of climate change programs and activities and so both activities are mapped in the SICAP GIS.

c) Biophysical data

Includes NDMO historical data on natural disaster cyclone events, tsunami, flooding, and earthquake. NDMO data available in an International online database called Desinventar. Unfortunately, this online database has not been updated for some years. Biophysical data also includes, rainfall and temperature fro Meteorology division, and earthquake data obtained from the MERE, identifying all earthquakes geo-referenced epicenters, depth, magnitude and year.

Additional vital data that are also required in the system includes medical data, food security, plant pests and diseases. The only Medical data currently available in SICAP GIS is for Choiseul province provided by Dr Melchior (PS MECDM).

Combinations of data from these three categories allow the GIS software program to run SQL queries that produces vital information that can enhance proactive planning and development planning etc. Information generated from data captured reveals various communities or wards that are exposed to various risks such as sea level rise, tsunami, tidal waves, flooding and landslides.

SICAP DATA STRUCRURE OVERVIEW

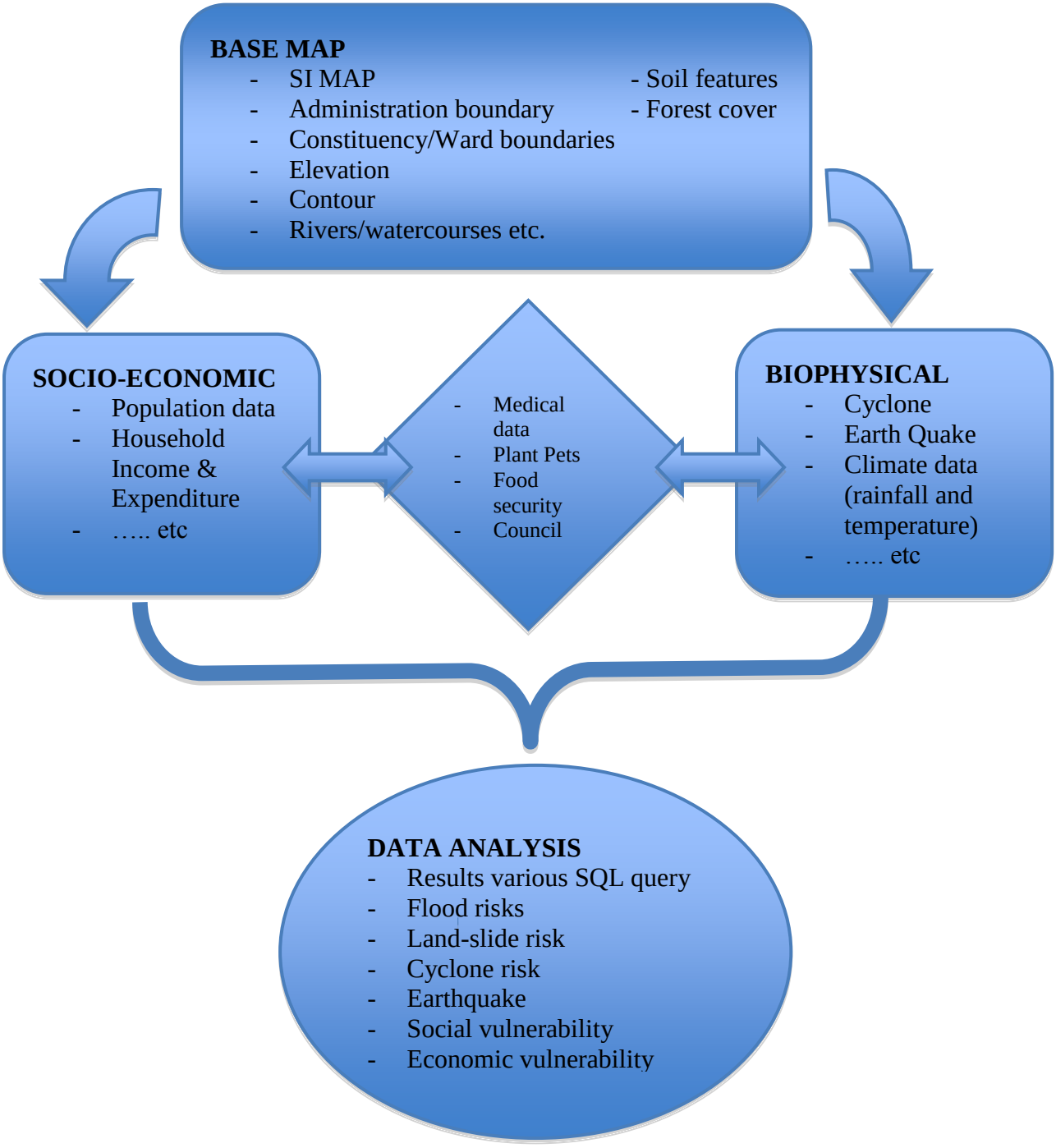

Figure 2 SICAP GIS Data Structure.

Data Compatibility

There are two types of data captured into the SICAP GIS. Both types were translated into a format compatible with the GIS database formats.

a) Geo-reference data – these are data digitized from geo-referenced rectified maps (raster image) as well as raw field data captured by survey instruments such as GPS or Surveyors Total Stations etc.

b) Non geo-reference data – these data are either stored in a spreadsheet, external object relational database. Similar data may also be extracted from past reports.

To produce a more accurate National Climate Change Vulnerability Assessment in the context of the Solomon Islands, it is very important to capture as many data across different sectors. Data collected by a sector can be enhanced further when they are combined with data collected by another sector. For example; by combining population data captured by statistic division, topographical data from the ministry of lands, and disaster data from NDMO will produce a better picture of our how vulnerable communities are to climate change within their respective wards. Such information may also support relevant sectors addressing climate change adaption.
In addition to physical vulnerability, the SICAP GIS can also produce results on social vulnerability. The only insufficiency social vulnerability result now is due to statistic division refusal to share its data. Examples of such data are, who is the head in a household, community, education level, type of building material used etc.

SICAP GIS DATA CAPTURED

1. SICAP GIS's object is to capture every available data retain by various governments ministries, NGO as well as private sectors and trusted individuals. Digitizing and setting up of a GIS baseline maps from the available data was done without less difficulty because most of these data are readily available. However, its data structure with the GIS must be properly designed. Government ministries such Forestry and Lands refuse to share their data. However, SICAP GIS has accessed some of these data through other sectors.

2. Only a 20-meters contour interval is available for the whole Solomon Islands. The SICAP GIS assignment, however, requested a 5-meter contour interval as baseline to work on. Have enquired for a 5-meter contour of Solomon Islands within the region, but there is none. To develop an accurate 5-meter contour interval;

    a) Requires high-resolution satellite imagery, conducting field survey using survey grade GPS etc. This exercise will take time and is very costly.
    b) Alternatively, the other option available is to interpolate a 5-meter contour interval from the available 20-meter contour interval using a software program. The software program available to do such interpolation is the Vertical Mapper software program.

    Vertical mapper is very powerful GIS software compatible with MapInfo. When it is properly installed, vertical mapper appears within MapInfo drop down menu. Vertical mapper can produce grid files and 3 dimensional (3D) views where it is necessary to

view data in such formats. Fig. 3 and Fig 4 below depict a 5-meter contour interval and a 3D view of Santa Cruz Island respectively generated from Vertical mapper.

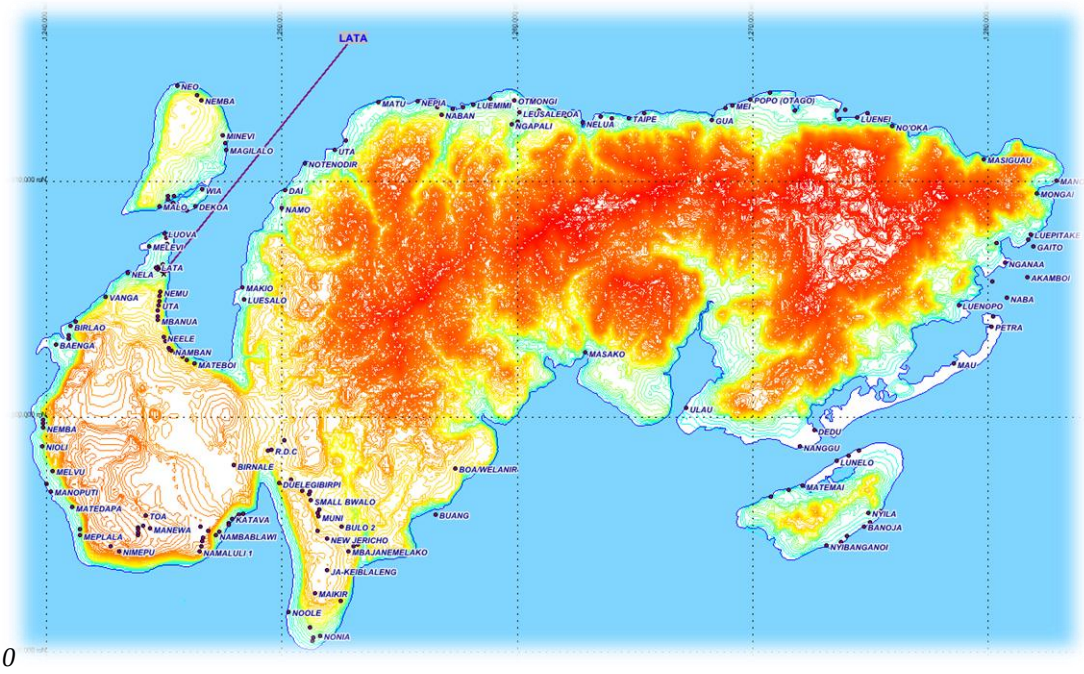

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Figure 3 5-meter contour intervals.

c) Most biophysical data are made available from MECDM divisions (NDMO, Meteorology, and Climate Change Division) therefore; they are easily accessed and uploaded into the system.

   Earthquake data ranging from 5 to 8 rector scale since 1900 to 2009 from seismology divisions of the ministry of mines is was also captured. With these data SICAP GIS can produce a buffer to see with communities or provinces vulnerable to landslide, tsunami etc. More knowledge on the behavior of earthquake is required to refine analysis and ensure results produce by the GIS efficient.

d) Socio-economic data are the most important data for the SICAP GIS. Particularly the population data. Unfortunately accessing the latest population data of 2009 census is not possible. Despite several attempt by CCD requesting the population data, it was made available. According to statistic division, this data is yet to be officially release to the public. We however, have access to a report base on the 2009 census that provides population summary data for each electoral ward, consistency and provinces. These population summaries do not give us good result for our assessments because we want to see the affect of climate change on total number of people within a settlement in a particular ward.

   The lowest statistics unit data available in the SICAP GIS system now are the household geo-reference data. In the absence household population data,

various analyses in the GIS are based on the number of households with in each ward.

e) The Household Income and Expenditure (HIE) data from 2006 survey was made available but again, it is only summaries for each province. Up to the end of this contract the HIE sample data collected by statistics are yet to be supplied

f) Soil map – Soil Map is very important to identify what type of soil is vulnerable to landslide, or is fertile and favorable for farming. Soil data of the whole country loaded into SICAP GIS were made available by SOPAC.

g) Forestry data – Solomon Islands forestry types and the land cover of all the provinces including concession boundaries identified by relevant ministry up to 2003 data have been uploaded into the SICAP GIS.

h) Reefs – Known reefs in all provinces are also captured into the SICAP GIS system. Information about the reefs may be vital for MPA database.

i) Digital Terrain Model (DTM) or Digital Elevation Model (DEM) such as in Fig. 4 below is generated from the SICAP GIS using Vertical Mapper software program. DTM data enables users to better visualize and evaluate elevations and by using additional software such as ERDAS together with the existing database, it is possible to determine elevations that are vulnerable to landslides.

   Additional data such as settlements and households can be included into this 3D model. For example, reports on the recent tsunami disaster in Temotu reveals that, the vicinities indicated by arrows in the image blow have experienced massive destructions because they are locate in low line coastal areas. Result from an SQL shows that within these settlements, there is a higher number of houses constructed below 5-meter contour intervals.

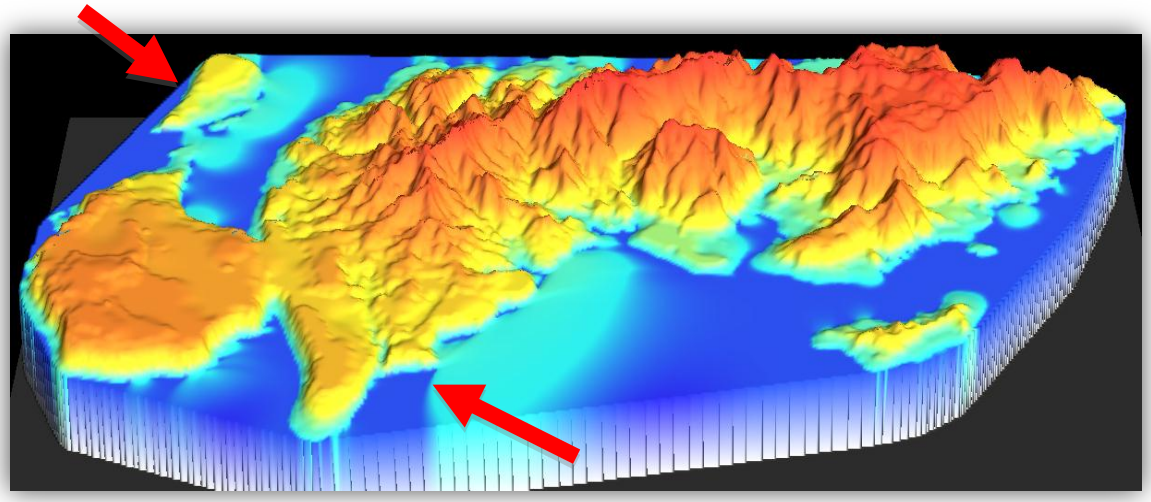

Figure 4 Example of GIS 3D Model of Santa Cruz Island.

j) SICAP GIS also captured all Government facilities as educational and clinics facilities in all provinces.

k) Bathymetry map of the ocean floor of Solomon Islands clearly reveals the earthquake belt and also the ocean floors where various existing tenements have been mapped.

SICAP SQL/MapBasic/Database

Apart from locating and digitizing existing, SQL and MapBasic Scripts have been written to automate data analyses and reporting. The SQL scripts are simple (uses human language scripts) and can easily be understood up by non-programmers. All SQL written for this project are saved in SICAP GIS directory and can be reused amended or upgraded from time to time depending on the types information required from the system. More about the SQL will be made available in the user manual.

MapBasic programming language is a bit advance for non-programmers. It takes time to be thought as a result this was left out from our GIS training. However, there are few Mapbasic programs written for SICAP GIS that are currently running. These programs automate and reduce some steps required to retrieve various maps.

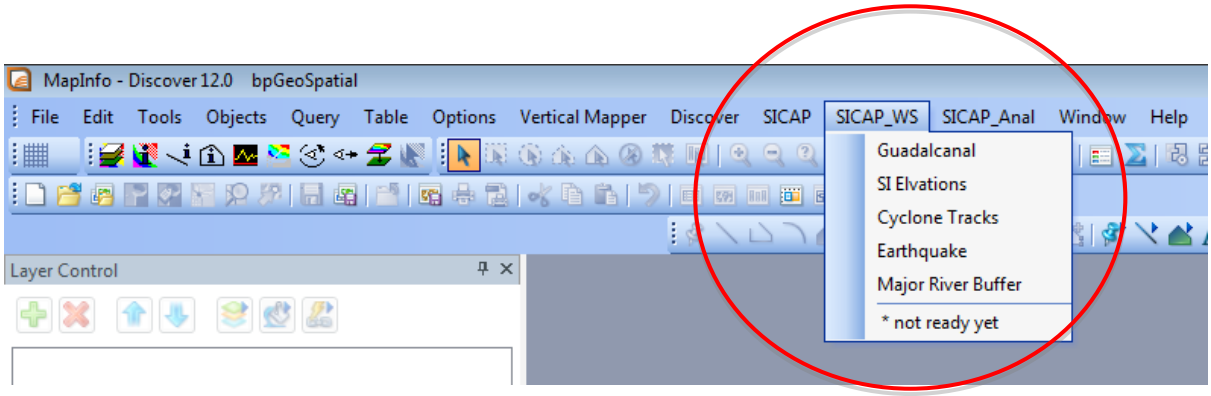

Figure 5 MapBasic program creates SICAP menus

The existing database holding all the data uploaded in this SICAP GIS are developed within in the MapInfo system itself. As the SICAP GIS further develops, Microsoft Access relational database should be used to store and exchange data within MapInfo. MS Access provides excellent reporting facilities and can be linked with the GIS database in MapInfo.

Within SICAP GIS, all the data coming from NDMO are loaded in an MS Access interface that link with the MapInfo. When new data are entered through the MS Access Interface, the GIS database is automatically updated. (See appendices for MS Access Interface).

SICAP GIS Workshop

During SICAP GIS implementation, CCD organized a GIS workshop and invited different stakeholders. SICAP GIS development and its purpose were present at the workshop followed an open for discussion to get some inputs from all stakeholders. Stakeholders present at the workshop commend CCD for developing this very important tool. For many,

what SICAP GIS is capable of doing is new and were interested to have their data loaded in the system. Most participants at the works have agreed to share their data with SICAP GIS and looking forward to get some support from the system. It was revealed during the workshop that, information generated from this GIS system is available to other the sectors, provided they request it through the MECDM.

Examples of SICAP Data Analysis output

(See sample outputs from the SICAP GIS in the Appendix at the bottom)

With the current data captured, this GIS system is capable of combining several data layers from the three categories to highlight various aspects of vulnerability, hazard or other information. For instance,

a) Basic output

- How many villages or households and number of males and females, in a ward for particular provinces
- Identifying households close to steep slopes that vulnerable to landslides
- How many tropical cyclones pass through the provides and possible damages that have been recorded
- Number of male and female in different ages groups within wards in different provinces ***(see appendix 1)***

b) Advance output

- Which provinces are subjected to frequent cyclone risk or earthquake
- Which wards or provinces have the highest number of households living under 5m contour
- How many households or government facilities (schools/clinics) are constructed adjacent to major rivers within 20m and 60m buffer that might be at risk during flood and landslides. ***(See appendix 2)***

Note: There are unlimited ways of developing these analyses, provided we have clean data in the system. As the GIS database is further developed and updated with new layers, better results shall be obtained. Explanations on these data analysis can be seen in the user manual.

GIS Training.

Two MECDM staffs (Mr Theddeus Siota & Geoffery Maunasi) have been given basic GIS training in between their busy work schedules throughout this assignment. So far they have good knowledge on the GIS software and how GIS database within the GIS software program are design and updated. Their GIS knowledge and skills has been further enhance in a weeks GIS training facilitated by UNDP. The staffs will need to improve their GIS skills by continuously working on the SICAP GIS system each week.

Most demanding tasks from now and onwards in SICAP GIS system are updating of existing database as well as digitizing new data to create new map layers as well as retrieving required information from the system. Both staffs have been trained on the different methods of capturing new data into the system and updating the GIS database using GPS, digitizing from existing maps and Google Earth Image.

To make sure that both staffs gained confidence in manning the SICAP GIS system, I will be available to support them. This support will be at no cost. Both staffs are now included in the local GIS users group who meet ones a month so this is also an opportunity for them learn form other users and improve their skills.

The challenge

The biggest challenges SICAP GIS implementation faced throughout the assignment is accessing data held by others sectors. Some data, especially census data containing personal bio-data, according to the statistic division it is be confidential. However, for a GIS system to produce a good representation of population affected by climate change, it is very important to get the latest population data.

Secondly, it was noted during visitation to several departments that, there are valuable data not compatible with the GIS database that needs to be translated to a compatible format. For example, data from hardcopy reports.

Thirdly, many sectors do not appreciate keeping or recording of their data in a systematic and consistently manner. As a result so many vital data are missing.

Lesson Learnt

SICAP GIS has started a very important chapter in bringing data from different sectors in a central GIS data system. To some organizations sharing data is not normally practiced. Because they spend so much to collect data therefore do not want to share what they have. During the GIS workshop, participants saw a glimpse of what GIS can do and the importance of sharing data. Some participants in the workshop have supported sharing of data and they themselves are willing to share their data.

Following the GIS workshop, staffs from the Ministry of education and Save the Children have visited SICAP GIS and are planning to share what they have. Rather than duplicating what SICAP GIS has they believe that sharing data would be the best.

Data update required CCD immediate attention

a) Agriculture data (food security, pest & diseases, land use etc). SICAP GIS is yet to capture any data related food security, pest & diseases, land use etc. In the ministry concern does not have a proper database for these. CCD needs to follow up with the Ministry of Agriculture and Livestock
b) Follow up with Forestry for up-to-date Forestry data. The director has given approval already during the GIS workshop.
c) Continue liaise with medical authority for Medical data (eg. all cases recorded in clinics)
d) Continuous liaise with MID for Infrastructure data
e) It is important to get hold of the 2009 Census/statistic data when it is released
f) Follow up with Ms Francis (Ministry of Education) and Ms Melissa Mathews (Save the Children) for school data relating vulnerability and climate change.

Recommendations

To ensure SICAP GIS database potential is maximized, it must be populated and with new data layer continuously. The following are highly recommend for SICAP GIS in the future.

1. All CCD staff must be able to access and view GIS data remotely from their own PCs. This means, CCD must have its own GIS server installed in LAN that enables staff to access
2. Every CCD staff or MECDM going on field trips must be taught how to collect data using GPS.
3. To make certain information captured in SICAP GIS are appreciated and fully utilized it is important to avail the information to others sectors and institutions. This may encourage them to share their data.
4. CCD or MECDM, through SICAP GIS set up must promote awareness to other divisions, ministries, sectors and stakeholders on the value data they have captured.
5. CCD staff(s) responsible for the GIS system must be allowed to attend monthly GIS users meeting or further GIS training when it is available
6. SICAP GIS must Contributing to climate change adaptation and reduction of vulnerability of people and community of Solomon Islands.
7. CCD must look into
8. It is highly recommended that CCD staff working on GIS must have a continuous communication with the GIS Consultant, especially when in doubt.
9. It is very important that the GIS data is backed up on a external hard drive. Currently I have a copy the your data and will continue to work on some MapBasic programming and MS Access database interface.

Conclusion

SICAP GIS has opened a new chapter for CCD in terms of mapping data depicting the effects of Climate Change in the context of Solomon Islands. Geographical Information System is a cutting edge technology, a very powerful tool available for use across different disciplines and sectors. This system can holds unlimited number of data and map layers and it may only become ineffective users stop using it.

A baseline map in Geographical Information System format is now available in CCD and is capable of holding many more data layers. The system will become a very powerful tool as more and more data are being captured. It was stated during the GIS workshop in this report that data is the key to the effectiveness of any GIS system; otherwise, a GIS system will not fulfill its purpose.

More than 20 organizations participated in the GIS workshop are now aware of the SICAP GIS. Some have already enquire about having their data loaded into the system and retrieving information from its. Others have requested further details had a chance of having a look at the system to learn more about that SICAP GIS can do in relation to their requirement. This is an opportunity for CCD to build on the GIS baseline that has already been developed.

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PO Box 1326
HONIARA
Solomon Islands

CONSULTANT FOR

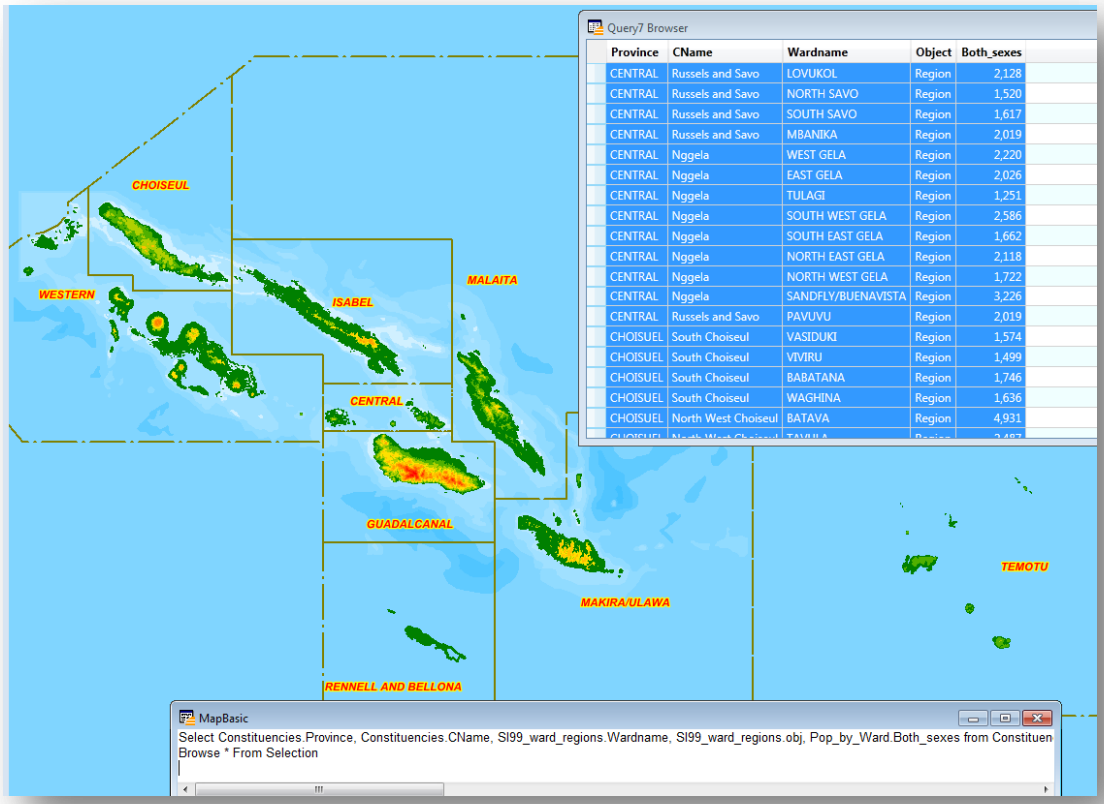
- Geographical Information System (GIS)
- Mapping & Surveying
- Information Technology (ICT)

Bryan Pitakia

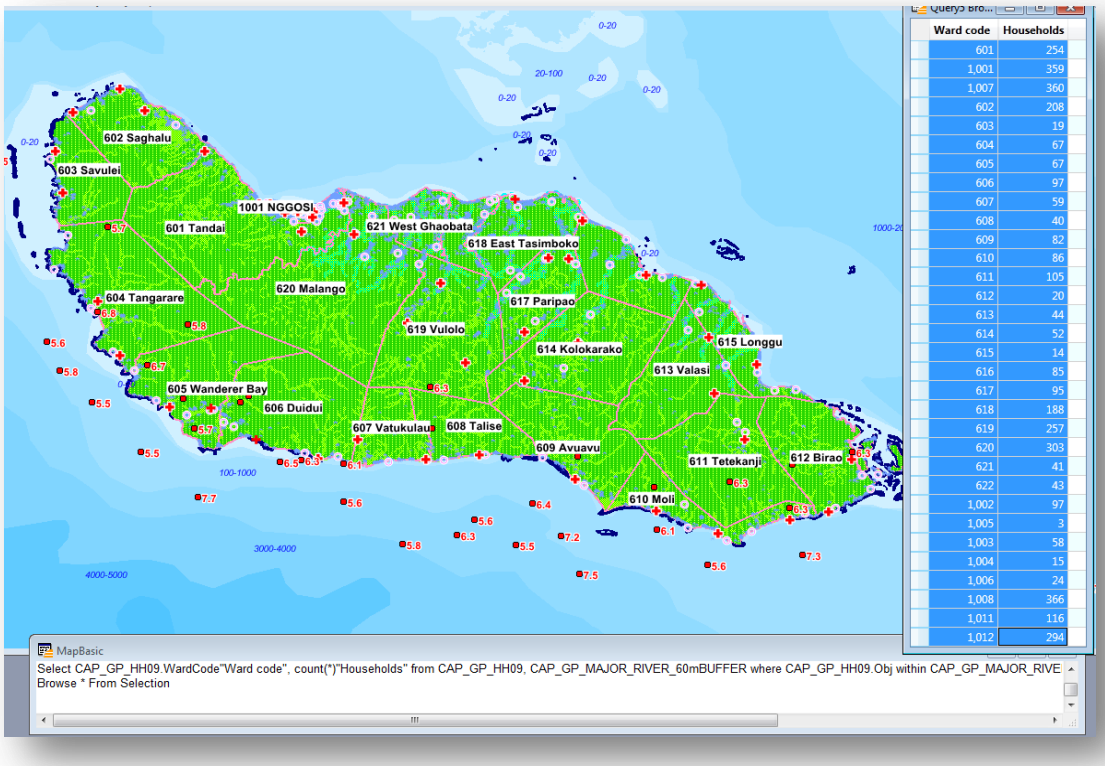
M/Phone: +677 76 36358
Office: +677 23231
E-Mail: bpitakia@solomon.com.sb

Appendix

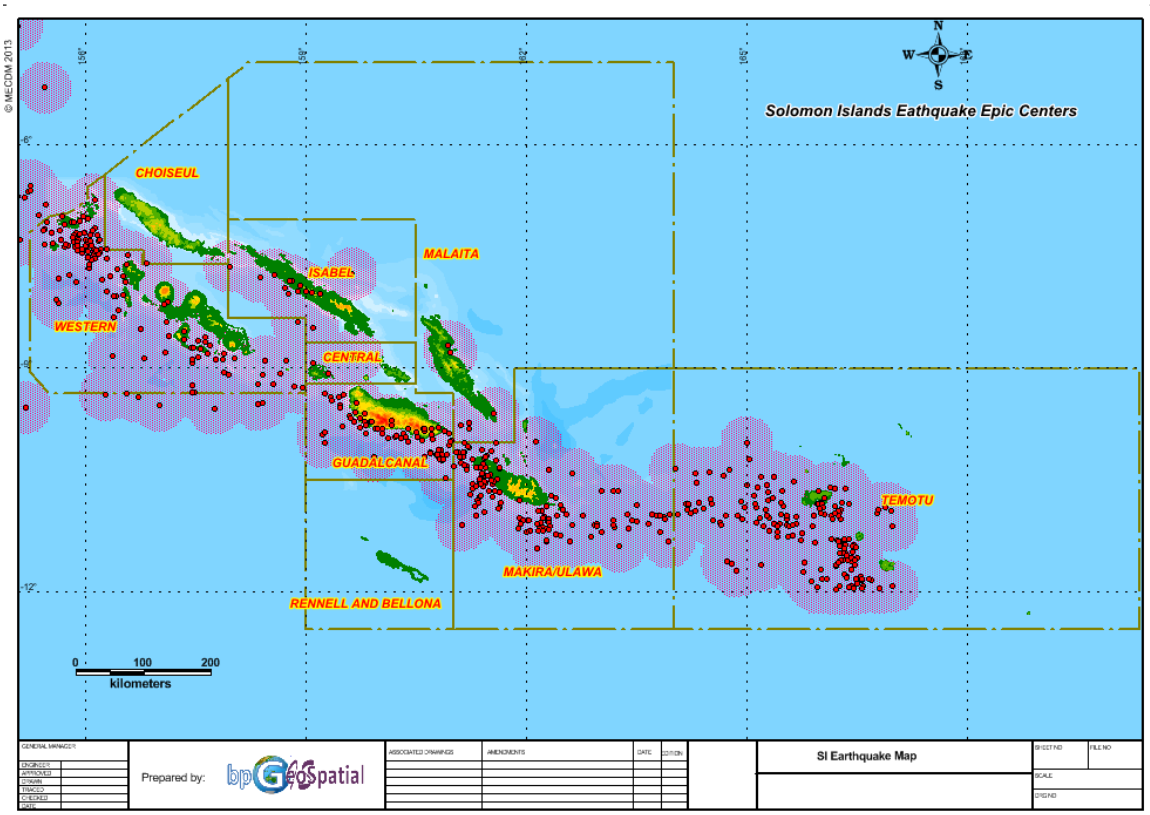
Appendix 1 - Query retrieve total population in each wards



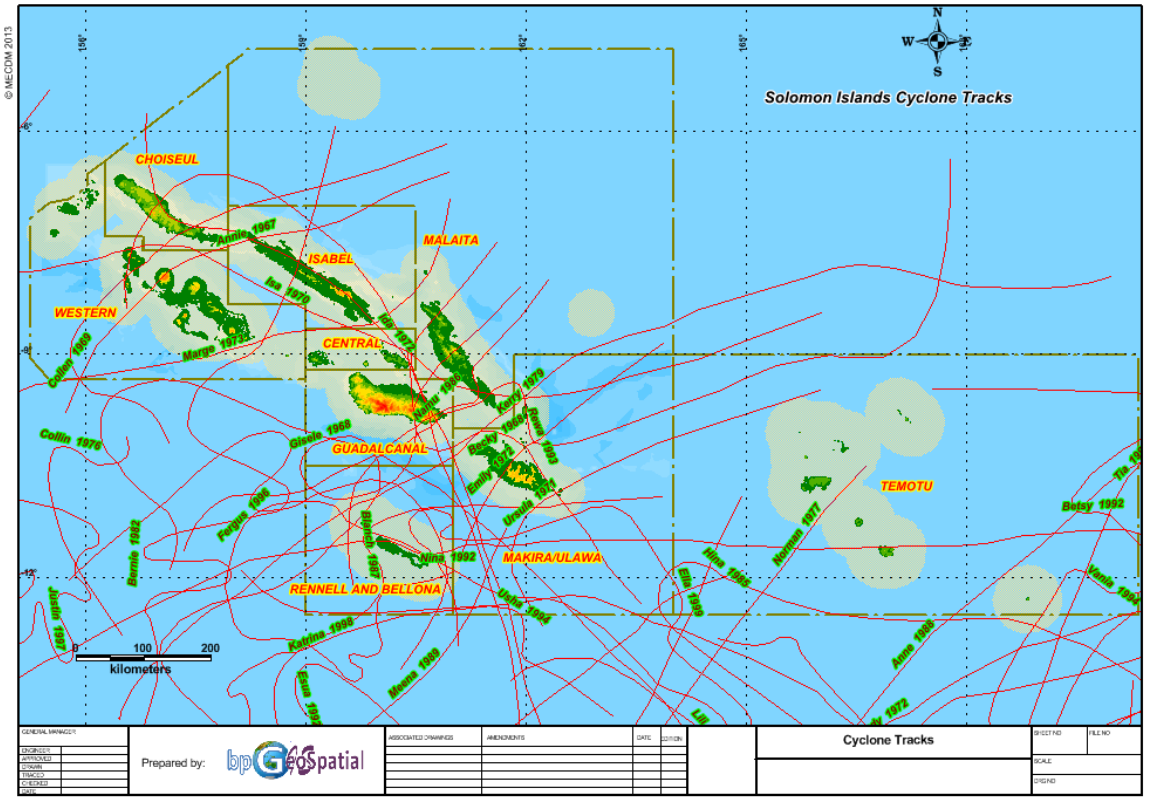
Appendix 2 – Query retrieve total number of household along 60m buffers of major rivers in Guadalcanal



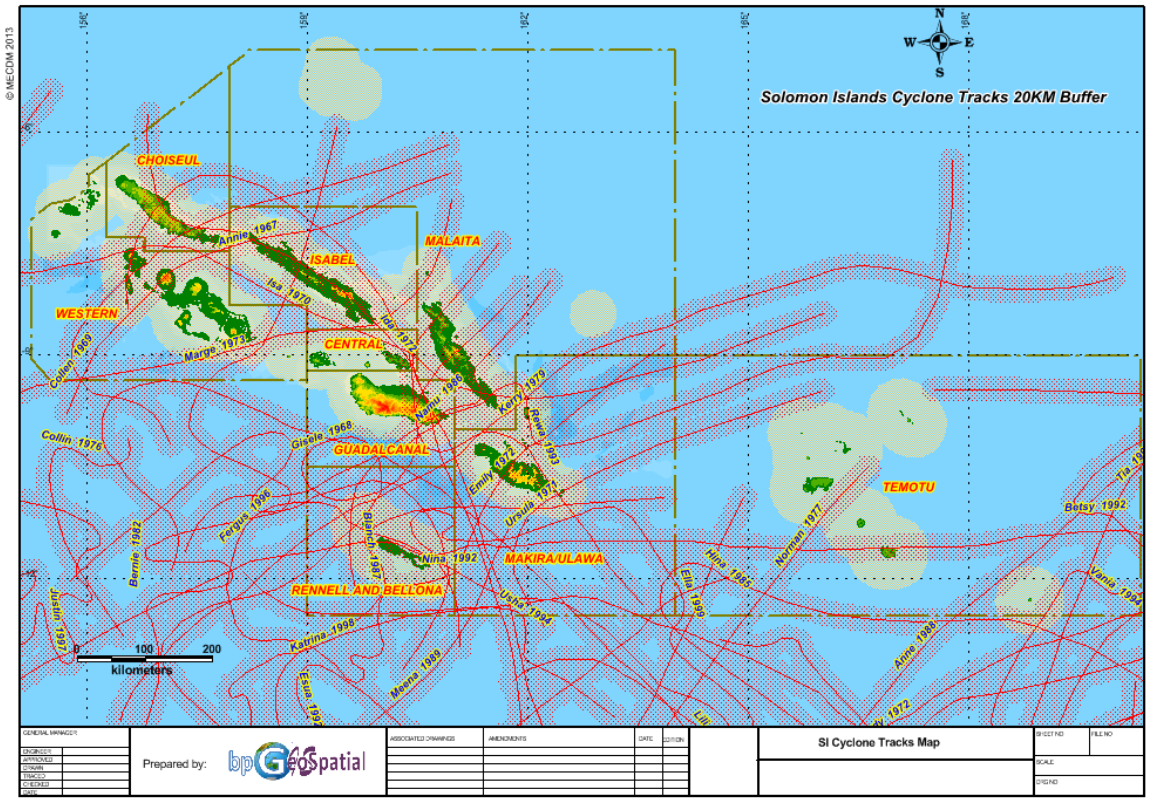
Appendix 3 – 35km buffer of earth epicenters



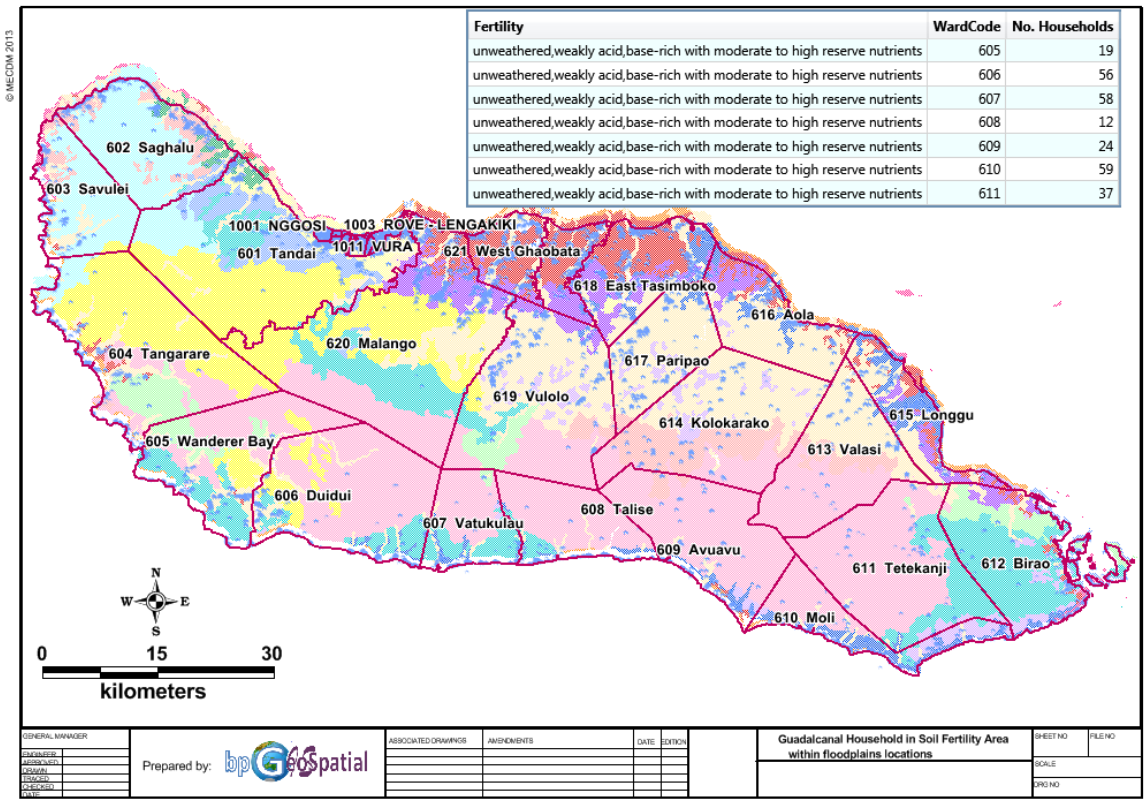
Appendix 4 – Cyclone tracks



Appendix 5 – 70km buffer along Cyclone tracks

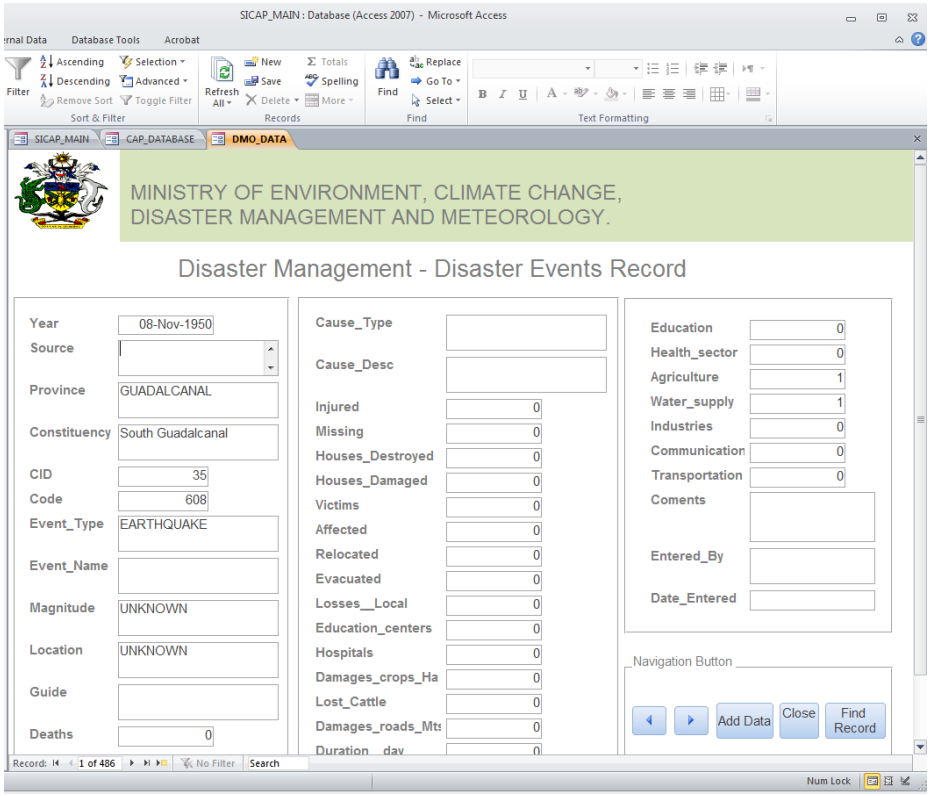


Appendix 6 – Query retrieves total number of household located in fertile land in each ward

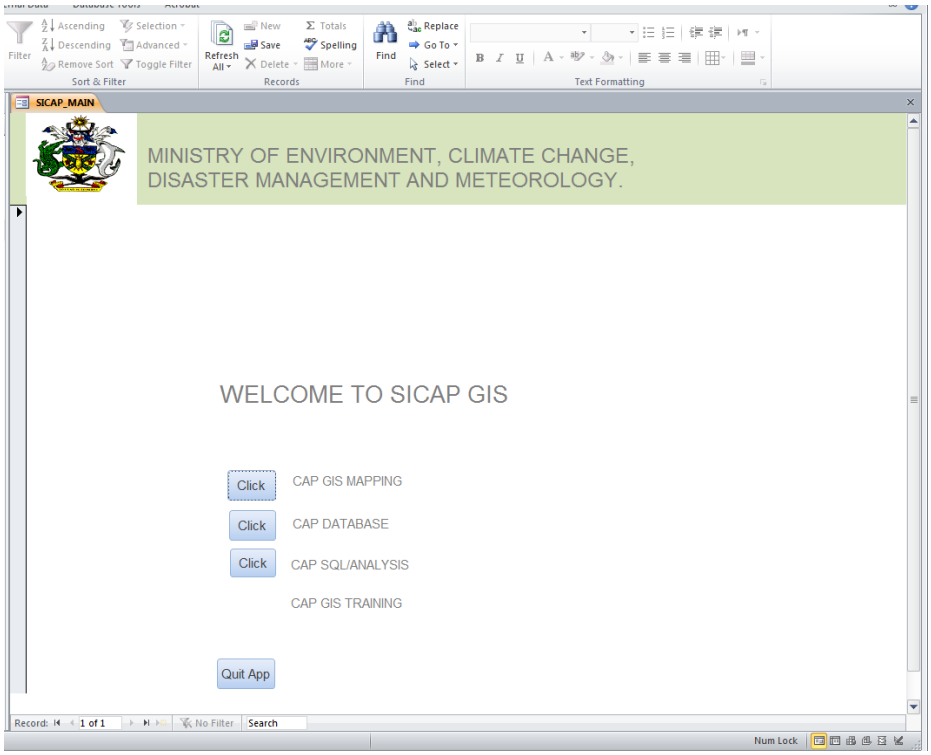


Fertility	WardCode	No. Households
unweathered,weakly acid,base-rich with moderate to high reserve nutrients	605	19
unweathered,weakly acid,base-rich with moderate to high reserve nutrients	606	56
unweathered,weakly acid,base-rich with moderate to high reserve nutrients	607	58
unweathered,weakly acid,base-rich with moderate to high reserve nutrients	608	12
unweathered,weakly acid,base-rich with moderate to high reserve nutrients	609	24
unweathered,weakly acid,base-rich with moderate to high reserve nutrients	610	59
unweathered,weakly acid,base-rich with moderate to high reserve nutrients	611	37

Appendix 7 – MS Access Interface to load NDMO disaster activity (Links with the GIS)



Appendix 8 – Proposed MS Access Interface for SICAP GIS



Appendix 9 – Participants in the GIS Workshop

Name	Institution	Contact	Attendance
1. Brian Pitakia	Consultant	7636358	√
2. Douglas Yee	CCD	24074	√
3. Hudson Kauhiona	CCD	24074	√
4. Rex Tara	SICAP	23031/2 ext 205	√
5. Thaddeus Siota	CCD	23031/2 ext 205	√
6. Malchai Batee	CCD	23031/2 ext 205	√
7. Nesta Leguvaka	SICAP	23031/2 ext 205	√
8. Gordon Konairamo	MOFR	24524	√
9. Fred Siho	UNREDD+	7498983	√
10. Susan Sulu	MDPAC	38255	√
11. David Hiba	Met/MECDM		√
12. Agnetha Vave Karamui	ECD/MECDM	23031/2 ext 206	√
13. Dalton Hone	MoLHS	23365	√
14. Jabin	MID	8546323	√
15. Carlwyn Tengamoana	MID	7586656	√
16. Marcus Sainsbury	MID	31322/7762992	√
17. Carlos Tatapu	MMERE	21522 ext 217	√
18. Samuel Maeda	Wisfort	7416226	√
19. Leslie Kwaiga	Wisfort	7476763	√
20. Cameron Vudi	SI Red Cross	22682	√
21. Judy Inapi	Live and Learn	23697	√
22. Romano Tarohamia	Swock/UNDP	27446	√
23. Casper Supa	PACC	28337	√
24. Frances Revo	MERHD	28803/7712408	√
25. Simon Uesikoke	MRD	25238/7765708	√
26. Issac Lekelalu	MMERE /Water	21522 ext 204	√
27. Gavin Bare	Solomon Water	23985	√
28. Jimmy Hilly	RWSS/MHMS	28166/7493547	√
29. Hampton Pitukolo	NDMO	27937/7469974	√
30. Sipuru Rove	NDMO	27937/7724900	√
31. Alphonsus Osifo'oa	HCC/Physical Planning	23014/7686770	√
32. Morgan Wairiu	Live and Learn	7491443	√
33. Lorrima Tuke	Oxfam	22004	√
34. Pearson Simi	NDMO/PDO	7481232	√
35. Lawrence Hillary	World Vision SI	23092	√
36. Michael			√