GIS SPECIALIST'S EXIT REPORT
(January 2006 – November 2006)

Executive Summary

The year of 2006 is the year of the Programmes full facilitation in one of its schemes called "*Land Use Based Barangay Development Plan*". The latter is an enhanced version of the LGUs existing Barangay Development Plan which includes profiles and analysis maps as basis for identification of proposed projects. The accuracy of these maps is greatly improved through the use of computer mapping tools such as Geographic Information System and Global Positioning System. With this, community has to go to systematic analyses and review of the barangays existing map profiles before plans and projects can be proposed.

There are two major activities that the GIS consultant has to conduct this 2006 and these are the following: (1) Monitor and assure the quality of maps produced both by community and GIS operators and (2) Development of *MIS on BDP for LGUs* manual as a guide for the municipalities in operating the said system.

During the land use based mapping, several problems were encountered including of which are the number of maps produced by the community against the time needed by the GIS operators for processing. Another is the number of GIS operators capable to apply the skills learned from the previous GIS trainings to the maps of LUB-BDPs.

GIS and GPS have two major roles on the LUB-BDP scheme. One is the production of a perimeter survey done through field surveys and another is digitizing maps produced from community land use mapping. A delay on this activity can also cause a delay on the entire process of LUB-BDP. With the aforementioned problems, the GIS specialist had scouted institutions and GIS service providers who can assist in the processing of maps. He had also developed a procedure to better check the quality of community maps before it undergoes the digitizing process.

So far, all community maps are being distributed to the GIS service providers for processing. These service providers are those MLGU GIS operators who have been trained by the Programme and gained advanced knowledge on GIS/GPS thus being capable to meet the map output that will be placed on LUB-BDP. With regard to the capacity building of the other municipalities on GIS and GPS, it is suggested by the GIS consultant to have the last training on GIS/GPS which focuses on the actual application in LUB-BDP.

ACTIVITIES AND ACCOMPLISHMENTS

1) **First Quarter of 2006**

1.1) MIS on BDP for LGUs user's manual

- Last 2005, after the development of *MIS on BDP for LGUs*, it had been piloted to several municipalities. The system had undergone changes and debugging before it was finally packaged and ready for installation on other MLGUs. With this, the creation of the *MIS on BDP for LGUs* user's manual was scheduled as the first activity of the GIS consultant. The user's manual is intended for the municipalities that have been installed by the MIS and are in need of hard copy guides in the operations of the system.

  Today, the implementation and installation of the MIS has been transferred to the responsibility of Planning, Monitoring & Evaluation Division (PMED). Bugs or errors encountered by LGUs are relayed by PMED to the GIS consultant for immediate corrections, thus an updated system will be re-sent to all municipalities having the MIS for updates.

1.2) Scouting of agencies/institutions for sustaining the GIS/GPS on LUB-BDP

- As the Programme has slowly integrated the land use based maps on the development plans of the barangays, so as the awareness and appreciation of the LGUs on the benefits and capability of the GIS and GPS in improving their spatial data.

  However, not all LGUs are still prepared to adopt the said mapping tools since they don't have dedicated personnel yet to focus in learning its operations. Secondly, executive bodies still needs further awareness on how these can be applied on various fields beneficial to their LGUs. With this, the Programme has scouted some institutions like University of the Philippines in Mindanao and the Department of Agriculture Region XI to have the capacity to provide future skills to LGUs when the life span of the Programme has ended.

  The Programme has also assessed LGU operators who had been formerly trained and have shown skill development. They are the operators that were further trained by the Programme in applying the GIS/GPS on LUB-BDP.

Individual operators and institutions that was assessed by the Programme that appeared to have their skills developed in applying GIS/GPS on LUB-BDP:

Institution/LGU	Name	Skills
Dept of Agriculture Reg. XI	Jovelle Fuertes	GPS unit operations
		GIS application on LUB-BDP
		Quality control on LUB-BDP maps
	Alex Bondesto	GPS application on LUB-BDP
		Quality control on LUB-BDP maps
University of the Philiippines in Mindanao	Rona Polinar Vyne	GIS applications of LUB-BDP
Freelance GIS operators in Mindanao	Romeo Bayawa	GIS and GPS applications on LUB-BDP
	Randy Abeto	GIS and GPS applications on LUB-BDP
Compostela Valley		
Laak	Rosalina Acido	GIS applications on LUB-BDP
Maragusan	Francis Marimon	GIS and GPS applications on LUB-BDP
Nabunturan	MPDO staff	GIS and GPS applications on LUB-BDP
Davao Oriental		
Mati	Rommel Manalo	GIS and GPS applications on LUB-BDP
Davao del Sur		
PLGU	Errose Marapao	GIS and GPS applications on LUB-BDP
	Romy	GPS application on LUB-BDP
Sarangani		
PLGU	Noel Ramos	GIS and GPS applications on LUB-BDP
	Arnold Santos	GIS applications on LUB-BDP
Malapatan		GIS applications on LUB-BDP
South Cotabato		
PLGU	Raul Sese	GIS and GPS applications on LUB-BDP
Davao del Norte		
PLGU	Aniceto Ipanag Jr.	GIS and GPS applications on LUB-BDP

Today, the aforementioned institutions and LGU operators are the primary skill providers of the Programme that will be invited to act as facilitators on the proposed training in the application of GIS/GPS on LUB-BDP seen to happen early of year 2007.

1.3) Preparation of MLGUs on the Perimeter Survey activity

- The first activity of GIS/GPS in the LUB-BDP scheme is the perimeter survey. During this activity, the GPS surveyors should have properly coordinated with the community guides on the boundaries that will be surveyed. They should be well aware on the routes to pass most importantly the operations of the GPS units.

During the preparation for the survey, the GIS consultant had carefully discussed the involvement of the community on surveys and the boundaries that will be generated after the activity. This was done on every municipality that will conduct perimeter survey. The Programme had considered this as a vital activity since the process requires the GPS surveyors to conduct a reading on the actual boundaries of the barangays based on the agreed boundary of the community. Mostly, all LGUs were new to the participatory GIS/GPS mapping process and needs to be properly guided and introduced with the scheme for them to arrive on the expected output.

2) Second Quarter of 2006

2.1) Continuation of activity 1.3 to other municipalities

- This activity has been continued during the second quarter of 2006 to other municipalities preparing for the perimeter survey.

2.2) Troubleshooting and quality control of field surveys

- Municipalities that have finished their field surveys had been closely monitored by the GIS consultant to check the quality of the surveys. Boundaries that are impossible to reach are considered, otherwise, they were asked to improve their maps by getting additional reference landmarks. The output of this survey is a Perimeter Map which will be used by the community in identifying the different land uses, profiles of their barangays.

2.3) Coaching of skilled GIS operators on the application of GIS/GPS in LUB-BDP

- During this quarter, the GIS consultant had started coaching skilled GIS operators on the application of GIS on LUB-BDP. This includes the GIS operators of Nabunturan and Laak of Compostela Valley, Mati of Davao Oriental and PLGU operators of Davao del Sur, Sarangani, South Catabato and Davao del Norte.

3) Third Quarter of 2006

3.1) Continuation of activity 1.3 to remaining municipalities

- This activity has been continued during the third quarter of 2006 to remaining municipalities that will undergo LUB-BDP.

3.2) Continuation of activity 2.2 to other municipalities producing perimeter survey maps

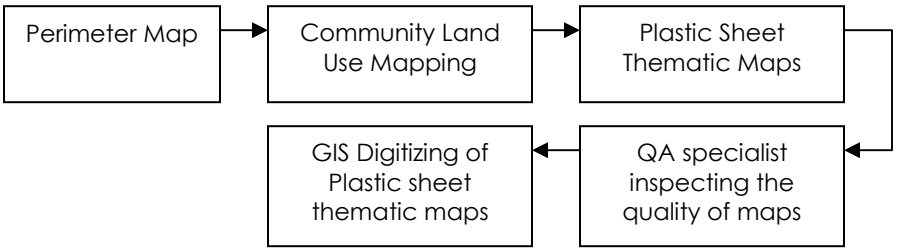
- Activity 2.2 has been continued during the 3rd quarter of 2006 since all barangay perimeter maps should be inspected before being used on land use mapping.

3.3) Utilizing the DA-GIS/GPS operators and a freelance GIS operator for assuring the quality of land use community maps

- During this quarter, municipalities that have finished the land use mapping needs for their output to be inspected. However, this activity demands time and manpower. With this, the GIS consultant had utilized the expertise of the DA-GIS/GPS operators and tapped a freelance GIS operator as quality assurance specialists. The DA-GIS/GPS operators will be monitoring covered LGUs under region XI and the freelance GIS operator will be monitoring covered LGUs under region XII.

Whenever land use mapping is finished, instead of bringing all maps for quality control and inspection to UDP office, the QA specialists will be the person to go to the municipality to directly inspect the maps, making the corrections faster since the service providers and mapping facilitators are present on the said LGUs.

Diagrammed below is the flow of the maps with the QA specialists present in the process.



3.4) Design options in digitizing besides the use of a tablet digitizer

- During this quarter, the number of municipalities finishing the land use mapping has greatly increased producing volumes of maps that need to be digitized. The Programme has only eight digitizing tablets distributed to DENR regions XI and XII and to the five covered provinces of UDP. With the volume of maps being produced per barangay, and with the time needed to finish one map, the need to find an option or other means to digitize the maps without using the digitizing tablet is very necessary.

With this problem, the GIS consultant has introduced the use of *Geo-referencing*. *Geo-referencing* is a method of converting raster pictures to vector by fitting the image to the GIS-based file. Utilizing the digital camera, taking a picture of the oversized plastic sheet maps and using *Geo-referencing* methodology is the answer to the limited digitizing tablets.

3.5) Designing alternatives to finish the digitization works utilizing LGUs GIS operators

- With all the maps being produced by the communities and with a few GIS operators able to apply their skills in LUB-BDP, the need to fully utilize these GIS operators and assist other LGUs in completing the digitization of maps is imperative.

As a solution to the problem, the GIS consultant together with the GIS operators made an agreement to assist in the digitization of maps of other LGUs after office hours. As an incentive, the Programme will pay for every map they will produce. With this, the GIS operators will further improve their skills in GIS and also, the LUB-BDP maps of the municipality will be finished.

4) Fourth Quarter of 2006

4.1) Monitoring and assuring the quality of digitized maps

- With the QA specialists and GIS operators in place, together with the methodology on how they will digitize the community maps, the GIS consultant's responsibility is to strictly monitor the deliverables of every operators given the maps to digitize. The GIS consultant carefully inspects every map observing if the standards were followed.

This will be the activity that will be happening until all municipalities finish the Land Use Based Mapping. Though the maps come in volume, there are operators willing to digitize and convert the community maps into a GIS based data.

PROBLEMS ENCOUNTERED

During the implementation of GIS/GPS on LUB-BDP, several problems were encountered:

On skill development and awareness:

1) All LGU-GIS/GPS trained operators have various functions in their municipality leaving a very little time to learn GIS and GPS operations. This has been a long problem with trained operators at LGU which prevents them to fully develop their skills and has been problem also to the

Programme which prevents them to introduce a next level training or coaching.

2) The awareness of the LGUs on Participatory GIS where the communities are the key person to identify their boundaries still needs to be strengthened. LGUs technical staff is very much biased with the boundaries established by the Lands Management Bureau. Though the boundaries they released are the official boundaries, they also have to consider and compare the actual boundaries that the communities recognized. Because in reality, comparing the boundaries established by LMB and the boundaries recognized by the community, it has a discrepancy. This problem causes the GIS consultant to go to every municipality and explain the difference which demanded a lot of time.

On trainings and application:

3) The last GIS/GPS training conducted by the Programme was last 2004 aiming to introduce the basic operations both the GPS units and GIS software called ArcView. The training design relates the trainees in basically producing the map by downloading surveyed data from the GPS unit to the GIS software. However, when the LUB-BDP scheme had been fully implemented, though some GIS operators managed to develop their skills in operating the mapping tools, there is a lack of capacity to apply their skills in producing the maps of LUB-BDP. Unfortunately, conducting a formal training will not be possible since the preparation will take time and considering that the MLGUs had scheduled the start of their LUB-BDP.

4) The method of geo-processing which is now being used as a replacement for the tablet digitizers has not been introduced during the GIS training years of the Programme to the LGUs. This is for the reason that geo-processing is the next level of training planned by the Programme after the LGUs gained skills on the basic functionalities of the GIS software. Secondly, the maps required during the community watershed maps are very minimal and can be handled by the use of a digitizing tablet compared to the number of average maps required on LUB-BDP.

On coordination with service providers

1) One problem noticed by the GIS consultant is the coordination between the Programme, LGU point person and Service Providers. In order to have a good flow on the process of LUB-BDP scheme, before the refresher course happens, the need to have a perimeter map is very much necessary since this will be used by the community as a base map in producing other thematic maps of the barangay.

   There are a numerous incidents that the service provider schedules a refresher course without coordinating with the survey team of the LGUs.

As an effect, since the communities are already informed on the date of the land use planning with the maps not being ready, the Programme will be forced to produce a barangay perimeter map based on the existing topographic map only. This process is not suggested for the reason that it eliminates the participation of the communities during the field survey and the said process encourages other operators to just conduct a table survey.

CONCLUSION

The Programmes' GIS and GPS procedural design based on the application of LUB-BDP had undergone several adjustments based on the problems encountered during the implementation of the said scheme. As of now, the GIS/GPS process are more customized to fit the LUB-BDP application utilizing very minimal resources and using uncomplicated methods that LGUs can easily adopt. The only problem that the Programme faces are the volume of maps that needs to be processed since very few operators were only introduced to this enhancement. Nevertheless, those LGU GIS operators and institutions that have been coached with the new techniques and methodologies is currently in assistance with other LGUs lessening the work load at the same time improving the accomplishment both the Programme and LGU.

RECOMMENDATIONS

1) All enhancements and new methodologies that were designed as a solution to the problems encountered during the LUB-BDP map development has not yet been introduced to other LGU-GIS operators. To update all LGU-GIS operators, the GIS consultant is proposing for the conduct of a training that focuses on the application of GIS and GPS on LUB-BDP scheme.

   During this training, selected LGU-GIS operators that showed expertise in GIS/GPS on LUB-BDP application and had been oriented by the Programme on the mapping standards will act as main facilitators. They will assist through coaching and hands-on training relating to all operations involved in developing the land use based maps.

   With regard to those LGUs that have lately managed to acquire the GIS software, they can also be included since the design will be intended for beginners and advanced users.

   As a counter-part of the LGUs, the GIS consultant strongly suggests to let the LGUs shoulder their hotel accommodation and meal allowances. The only expenses that the Programme will incur will be the honorariums of invited LGU-GIS operators, venue for the training and computers. Technical manuals and data of GIS/GPS in LUB-BDP will be developed by the GIS consultant and have it distributed at the start of the training.

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An invitation letter stipulating the aforementioned conditions will be sent to the LGUs as early as December 2006. The training is proposed to happen by the month of January 2007. Interested LGUs will be asked to reply on the said invitation.

ANNEX 1

Current status of the GIS/GPS activities in LUB-BDP as of November 13, 2006

1) Percentage of Municipalities conducted with coaching on GPS : 100.00 %

2) Percentage of barangays producing a perimeter survey with boundary map : 91.06 %

Compostela Valley	=	*88.89 %*
Davao Oriental	=	*97.67 %*
Davao del Sur	=	*83.33 %*
Sarangani	=	*78.95 %*
South Cotabato	=	*100.00 %*
Davao del Norte	=	*100.00 %*

4) Total area of barangays perimeter surveyed : 503,252.27 has.

Compostela Valley	=	*42.831.10 has.*
Davao Oriental	=	*174,403.06 has.*
Davao del Sur	=	*49,981.69 has.*
Sarangani	=	*101,214.33 has.*
South Cotabato	=	*115,175.14 has.*
Davao del Norte	=	*19,646.95 has.*

5) Percentage of barangays producing digitized maps : 32.26 %

Compostela Valley	=	*66.67 %.*
Davao Oriental	=	*39.53 %*
Davao del Sur	=	*33.33 %.*
Sarangani	=	*18.42 %*
South Cotabato	=	*12.90 %*
Davao del Norte	=	*31.25 %*