Forest Concession and Land Management Layers in PNG-FRIMS

Capacity Development Project for Operationalization of PNG Forest Resource Information Management System (PNG-FRIMS) for Addressing Climate Change

1. Background

Overview

As mentioned in Fact Sheet No.3, one of the four principal types of data in PNG-FRIMS is Logging Concession Information, however, Logging Concession Information in itself is very broad. This is why it has been broken down into 4 individual thematic layers:

- Logging Concession Boundary
- Logging Plan and Logged-over Area
- Forest Clearance Authority (FCA)
- Forest Plantation/Boundary Area

By overlaying these four layers, the result is the entirety of Logging Concession Information. The real value of overlaying layers comes from the ability to integrate only the relevant spatial information into one seamless map to derive spatial information not readily apparent to an observer. For instance, one viewer might want to see the extent to which an area inside a particular logging concession boundary has been logged-over, or see the geographical location(s) of the logging concessions in the country. These information can be found within the Forest Concession and Land Use layers in PNG-FRIMS.

2. Introduction

Logging concessions refer to the permits or licences to perform logging operations in an area which PNGFA has acquired and/or allocated. Currently there are three concession types; Timber Rights Purchase (TRP), Local Forest Area (LFA) and Forest Management Agreement (FMA). LFA's and TRP's are no longer being issued under the Forestry Act, 1991 (as amended), however they are still in use as they were saved under the Forestry Act, 1991 (as amended). FMA's are the only type of concession allowed under the Forestry Act, 1991 (as amended).

Generally, as most of the land in PNG is customary-owned, landowners who wish to allocate their land to generate revenue through forestry, transfer their timber rights in exchange for timber royalties and infrastructure developments. PNGFA then defines the land and enters into an agreement with the landowners on how the forest resources will be managed. PNGFA then allocates the concession area to a third party; in this case a logging company, to carry out the logging operation inside the concession boundary.

Logging plans refer to the sequence of logging proposals submitted by logging companies highlighting the areas in which they aim to commence their logging operations for the first 5 years and within the first year of operation (Annual Logging Plan and 5 Year Forest Working Plan); while the Logged-over Areas are the areas in which logging operations have already occurred. The Logging plans are broken up into smaller units called 'set-ups'. Set-ups represent the subsequent order in which logging operations are intended to occur or have occurred in respect to Logged-Over areas. Logging Code of Practice (LCoP) dictates that these two occurrences must have a duration of time in between so as to allow the logged over area to regenerate. Logging plans are mapped out and sent in by the logging companies for PNGFA to review and approve.

Forest Clearing Authority is a permit allowing a logging company to clear the forest over a defined land for other non-forest forms of land use, such as agricultural farming either under a Special Agriculture Business Lease (SABL) or on customary land where the owners have given consent for such non-forest activities to take place.

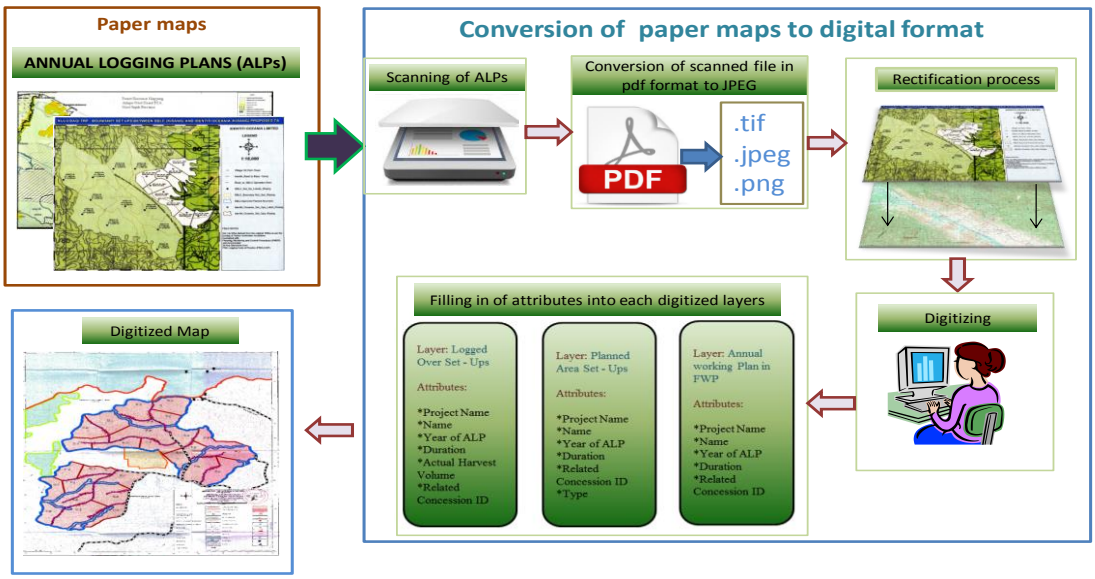
Forest Plantation Boundaries demarcate the areas managed by PNGFA and other logging companies for forest plantations as surveyed by GPS or extracted from the Forest Base Map 2012.

3. Methodology

Data Acquisition

Data	Source	Format
Logging Concession Boundary	Acquisitions Branch - PNGFA	Hardcopy/Softcopy
Logging Plan and Logged Over Area	Annual Logging Plans or Forest Working Plans maps provided by logging company	Hardcopy/Softcopy
Forest Clearance Authority	Logging company or Allocations Branch - PNGFA	Hardcopy/Softcopy
Forest Plantation Boundary	Surveyed by GPS or extracted from Forest Basemap 2012	Softcopy

All data received in Hardcopy format is scanned and digitized so that it can be stored in FRIMS. Below is a diagram that illustrates the process in which data is acquired and processed for all logging plans.



As all four layers are in essence "*Boundaries*", they are created in a similar manner but for different purposes. Digitization is the process in which geographic data from scanned maps are converted into digital vector data formats and represented as point, polyline and polygon features. Point features are usually log ponds, base camps, bridges and culverts (proposed/existing), villages, quarries, gravel sources and cultural sites. Polyline features represent main boundaries, roads (existing/proposed) and strip lines. Finally, polygon features represent coupes, set-ups, plantations and buffer zones. Thus, all layers listed above are digitized and have attributes added to them for their served purposes.

Basic Steps to Digitization

1. A shapefile is created in a folder location of the users choice.
2. The shapefile can be specified either as polygon, polyline or point depending on the user's needs.
3. If polyline or polygon is selected, select the editor tool and select points along the edges of the feature of interest.
    a. For polygons, select points until coming back to the initial starting point, this is called closing the shape.
    b. For polylines, select a point at the start of the feature of interest and continue to select points that run along the edges of that feature until coming to its end.
4. If point is selected, it is usually to digitize locational information, in which case, select the editor tool and select the locations of which the feature of interest is located.

Attributes

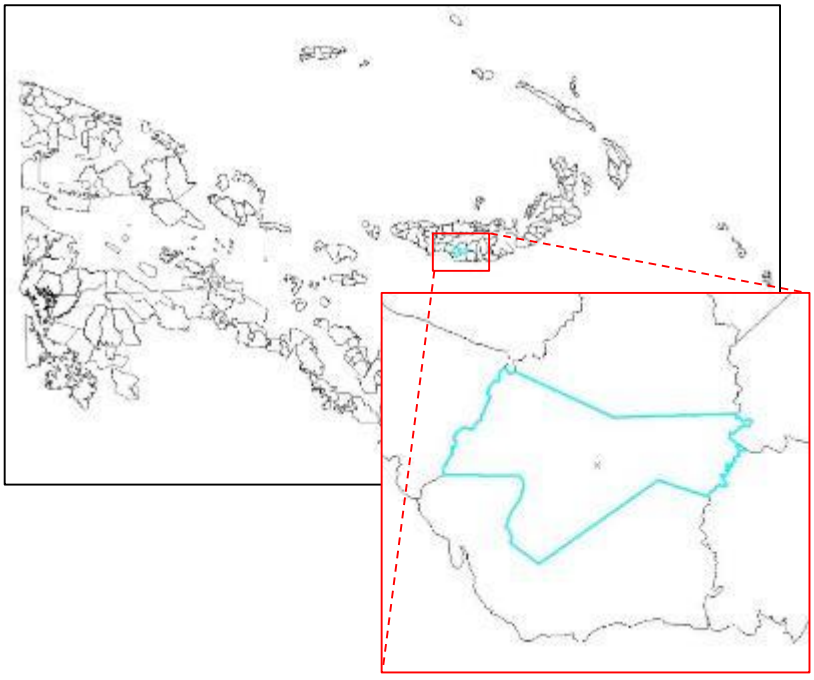
Once the shape file is created and the feature of interest has been digitized, the last step is to add attribute information to it. This is done by opening the attribute table of that feature and creating the necessary fields and entering its attribute information. Each of the layers are shapefiles, however, their attributes vary. The fields for the four layers are listed below.

Layer	Attributes
Logging Concession Boundary	Plan/Concession Id
	Name
	Area
	Purchase Date
	Expiry Date
	Concession Type
	Status
	Scale
	Province
Logging Plan	Project Name
	Project Type
	Name
	Year Of ALP
	Duration
	Concession ID
	Type

Layer	Attributes
Logged Over Area	Project Name
	Project Type
	Name
	Year of ALP
	Duration
	Harvest Volume (ha)
	Concession ID
Forest Clearance Authority	Project Name
	Project Type
	Name
	Year of ALP
	Duration
	Harvest Volume (ha)
	Concession ID
Forest Plantation Boundary	ID Name
	Species Name
	Date of Planting
	Date of Harvesting
	Area Size (ha)

4. Results/Output

Logging Concession Boundary



Attributes

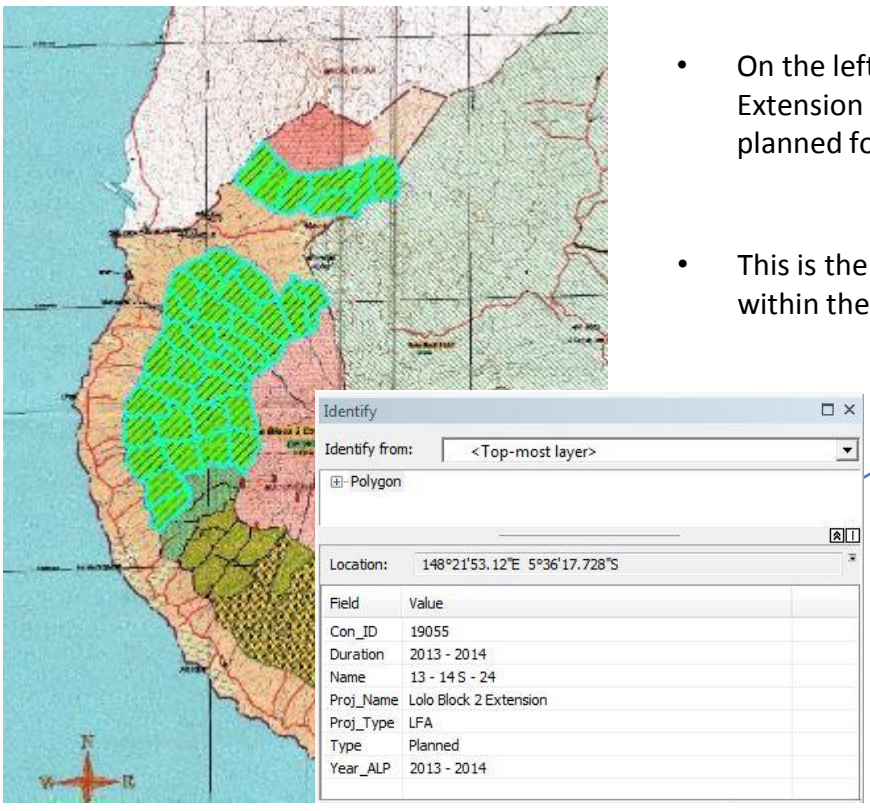
ConcessionArea_update_rev

Passismanua Inland

FID	24
PLAN_ID	1952
NAME	Passismanua Inland
AREA	39886.560734
PURCHASE	26/02/1992
EXP	25/02/2002
CONSTYPE	LFA
STATUS	Concession
SCALE	
PROVINCE	19

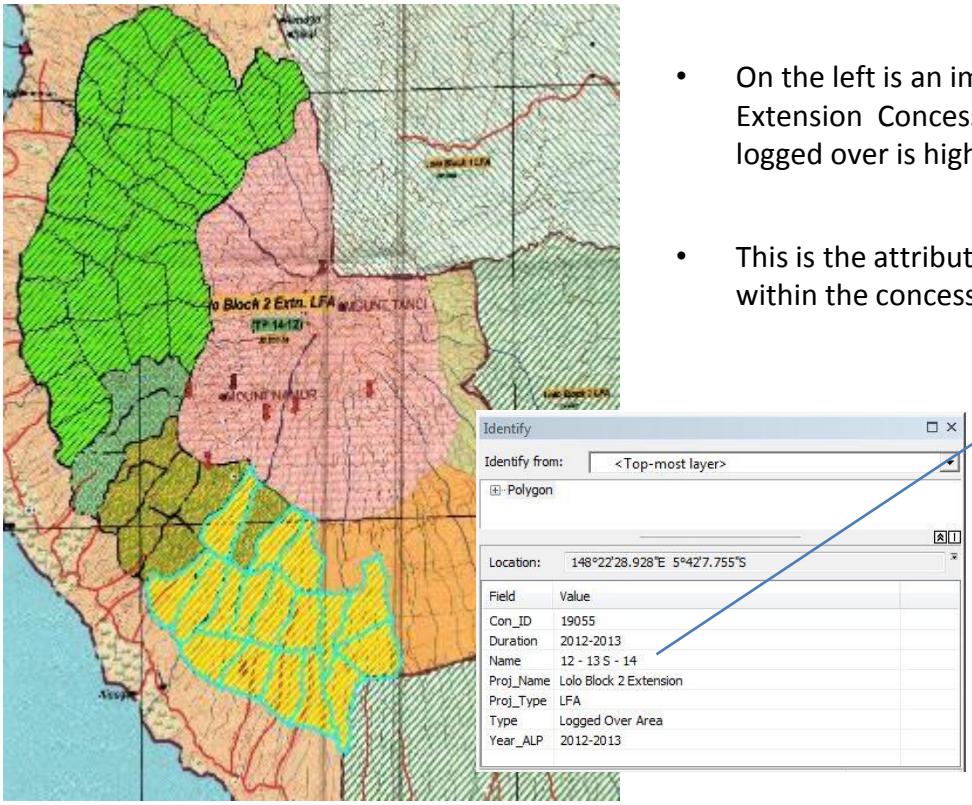
- Above is an illustration on the logging concession boundaries nation wide and on the right is the attribute information for just Passismanua Inland Logging Concession.

Logging Plan



- On the left is an image of the Lolo Block 2 Extension Concession, in which the area planned for logging is highlighted.

- This is the attribute information for a set-up within the concession, i.e. [13-14 S – 24]



- On the left is an image of the Lolo Block 2 Extension Concession, in which the area logged over is highlighted.
- This is the attribute information for a set-up within the concession, i.e. [*12-13 S – 24]*

5. Discussion

Issues and Recommendations

While the task of digitizing the different layers was executed without any major setbacks, there were a few issues that arose during the exercise. Chief among those issues was the lack of cartography standards adapted by the logging companies that submitted in their ALPs and FWPs. This has resulted in the submission of hardcopy paper maps that were erroneous and lacking basic cartographic principles, such as:

- Properly labelling features
- Using correct and consistent visual representation of the features being portrayed in the maps
- Following guidelines in map production in balancing both the comprehension of the map aesthetics and the accuracy of the information shown in the map

Another issue faced was the task of digitizing itself being quite tedious and slow. Since the maps submitted are in the form of physical hard copy paper maps, they would have to be digitized so the information can be stored in PNG-FRIMS. Although, digitizing is an important task of converting analogue data into digital data, it is time-consuming and requires a lot of manpower to continuously keep up and maintain with the amount of hard copy maps being submitted.

Digital Data Submission

Currently, PNGFA is working towards a standardized process of digital map submission by logging companies, which is more preferred than the traditional paper maps. This is done through the initiative of the "Data Exchange Specification" which highlights the data requirements to be submitted. This will not only improve the efficiency and productivity of the geographic information contained in the PNG-FRIMS but also aid in dealing with most of the issues faced during the process of digitization. The standardized process of digital map data submission will ensure:

- ❖ Ease of use in data manipulation and data analysis; as all data will be in digital format. This will reduce issues such as scanning errors or any physical handling errors, which will improve the overall accuracy of the data being processed and stored in PNG-FRIMS and increase the availability of readily prepared information.
- ❖ Better data storage and data management. There will be no need for the physical storage of paper maps, or the issue of degradation of maps over time.
- ❖ Less amount of time spent on digitizing as the task itself is tedious. This will allow more concentration on data analysis and other data preparations for PNGFA's needs or other stakeholders, such as logging companies, government departments and the general public.
- ❖ Efficiency in using the ALP data with other GPS/GIS data acquired by PNGFA officers

Improvement of Plantation Data in PNG-FRIMS

Submission of softcopies of logging plans and plantation activity by logging companies will be encouraged by PNGFA. Plantation data in PNG-FRIMS is not sufficient to show the current situation of plantation in PNG. As a result, PNGFA needs more effort to improve it by increasing the capacity of relevant officers of PNGFA-managed plantations, as well as the capacity of logging companies, to acquire accurate plantation data with the use of GPS/GIS technologies.

5. Conclusion

These thematic layers are contained within PNG-FRIMS and provide information regarding Forestry in the country. This information can later be used in other applications, problem-solving scenarios and modelling geographical changes. With even more advancements and progress planned for the future uses of PNG-FRIMS, the full potential of geographic information has much to be realized.

6. References

JICA and PNGFA, 2018, 'Papua New Guinea Forest Resource Information Management System - JICA-PNGFA Forestry Project 2014-2019 Fact Sheet No.3'. Papua New Guinea Forest Authority, Port Moresby, Papua New Guinea

PNG Forest Authority (JICA Project)
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JICA Project Site: http://www.jica.go.jp/png/english/activities/activity12.html
Project Facebook Page: https://www.facebook.com/jica.png.forest.monitoring/

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