

# TRANSITION OF SPATIAL COMMUNICATION IN PAPUA NEW GUINEA

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## **Abstract**

Communication is the lifeline to progress in any civilization and can be expressed verbally, literally, numerically or graphically. Graphic communication involves the use of symbology, via signs and symbols to convey messages to enhance visualization. In Papua New Guinea (PNG) the main form of communication before colonization (just before the First World War) was verbal or by “word-of-mouth”. Verbal cartographic communication has been the norm and many societies describe metes and bounds or make references verbally. The receiver or map-user stores the verbal message as visualized temporal mental map and executes the instructions. The present generation in PNG is in a period of transition between the old and the new systems of communication.

This paper emphasizes the importance of graphic communication in PNG. Traditional methods of space perception are discussed. Current status in general cartographic communication, cartographic institutions, their functions and datasets available in PNG are evaluated and discussed. Past methods, current practices and trends, Internet web mapping possibilities for spatial communication and education are analyzed. Optimal dissemination options are explored and proposed for graphic communication as a tool to complement literal and numeral communication to enhance spatial understanding and improve map literacy.

## **1. Introduction and Review of History of Spatial Communication in PNG**

It is a mystery and mind boggling for outsiders to come to terms on a united Papua New Guinea (PNG) with over 700 languages, diversified cultures, traditions and customs. The differences are notable from the complexion of people, accent of speech, pronunciation of words, appearance, dressing, local food, behavior and more.

Before colonization the main form of communication was verbal or by “word-of-mouth”. Information was passed down the generations orally in the form of legends, stories, songs, dances, initiations and rituals differing from place to place.

Some societies integrated signs and symbols to aid understanding and improve perception of environment by drawing temporary sketches depicting prominent topographic features or “Landmarks” like rivers, mountains, rocks and trees as references. The landmarks are normally within the immediate surroundings of the communicators. Cosmic phenomena like sun, moon and stars were used where there are no prominent geographic phenomena. There is no evidence of hardcopy record of past communication in literal, numerical or graphical form. This indicates that there was no innovation in civilization regarding communication in PNG. One suggestion could be that, the circumstance at the time did not require for a change or improvement in oral communication.

The invasion of western concepts opened doors to many areas and introduced new ways to repeat old tasks and communication is one example. Introduction of education added new dimensions to communication in literacy, numeracy and graphicacy. Graphicacy was not fully utilized as a method of communication via maps. As a result, many Papua New Guineans are not familiar with the different functions of maps. Changes in the fields of GIS and Cartography prompted by the transition in technology are rapid. Graphical form of communication is already in advanced stage without being properly introduced and developed for wider acceptance in PNG societies.

From the primitive signs and symbols to enhance verbal communication, Papua New Guineans now have computer graphic images and Internet web based maps without proper transition from mental-to-paper-maps, and paper-maps to web based computer maps.

## **2. Case Study of Communication in PNG based on “Stories”**

According to statistics provided after interviewing more than fifty university students from different parts of PNG, literature reviews, “short stories” from “one-talks” and colleagues, some interesting revelations were made. Some excerpts are listed below.

In analyzing the results of interviews, there is a correlation between communication and navigation in the primitive and traditional societies of PNG.

Nearly all the respondents from different parts of PNG indicated that there was no standard form of graphical representation for spatial communication. There was no form of spatial education in the traditional societies of PNG. Customary practices, traditional rituals and other practices were passed on from generation to generation by word of mouth. Some examples that involve oral transfer of information are like songs, legends, initiation rituals like beating the young, body piercing, shaving of hair, dancing and tattoos on body parts.

The geographical or other representations used for depiction in verbal communication varied from place to place. The features available in the locality and the methods in use for such applications mostly govern the users' choice. Some of the methods used in the traditional societies that still continue today are:

- Using natural prominent features or landmarks as references like mountains, rivers, trees, depressions and slopes.
- Streams are used with descriptions like confluence, upstream, downstream, left side, right side to depict direction or orientation.
- Vegetation description of area, smelling/aromatic and seasonal flowering plants.
- Special trees planted to demarcate boundary also used as references.
- The position and movement of sun, moon and stars.
- Displaying of white wood from certain trees, leaves and flowers as navigational aids.
- Smoke during the day and light in the night from fire for communication. Mirror reflections, lamps and torches now rapidly replace this practice.
- Beating of tree trunks and buttresses produce certain sounds for different messages and corresponding responses.
- By observing the presence of certain animals and sounds of other animals are also used for communication and navigation.
- Names of prominent places are used if the receiver is familiar with the area to some degree.
- Beating of garamuts or drums send different sounds to convey different messages for responses.
- Simple temporary sketches on the ground surface or sand to aid communication or using objects like stones and sticks to make spatial representations. Once the message is understood, the sketches are discarded.
- Stones and woods are carved and chiseled with different designs to convey different messages like tribal significance, hunting, dangerous crossing and waterfall (*Figure 1*).
- In the Jimi area of Western Highlands Province, there is a record of some primitive designs on big rocks and walls of caves to depict certain representations for communication. Designs are also cut out from tree barks for the same where there is no stone or cave in the vicinity.

It must be stressed that not all methods convey direct messages. Some are used as signals akin to coded messages in western society and needs to be decoded or interpreted by the receiver. That also requires common understanding and experience depending on the circumstance. Messages of significance are normally coded in different places especially relating to important trade or warfare. Example; sending a huge column of smoke into the sky early in the morning could mean an urgent invitation to attend some special ceremony for one group while it may warn of danger for another group.



**Figure 1.** Story board about half-men half-crocodile from Sepik province with designs to convey different messages like tribal significance, river crossing, and shows traditional patterns for vegetation and houses.

### 2.1. The Markham Case – Map for Hunting

Apart from the above, there is one interesting case from Markham valley in the Morobe province. In this case, there were some attempts made to simplify oral communication by employing graphical medium in their hunting system. A brief account is recorded here.

Hunting was a common practice in the area where this respondent comes from. In the past when hunters returned from hunting trips for wild pigs, the results were always poor with little or no catch. One day the hunters gathered together to come up with a strategy to improve their catch when different speakers spoke and

put forth their ideas. There was one man from the group who suggested that the primary cause for the poor result was due to unfamiliarity of the hunting area and lack of proper planning by the hunters.

He suggested that a reconnaissance survey of the area be made by selected hunters to locate the escape routes, the feeding sites, the resting places and general movements of the wild pigs. After the survey, the reconnaissance team will brief the hunting party on their findings. As most of the hunters were not involved in the reconnaissance party, verbal description of the survey was not sufficient for complete understanding.

So he suggested that the survey party would use some traditional paints to paint and depict the different strategic locations in planning for the hunting for visual perception, clarity, and understanding. The map was produced on the bark of a certain tree. On the plan, prominent topographical landmarks were demarcated as references to locate the different sites for the pigs' locations and movements. Point symbols were used for locations, line symbols for movements and area symbols for feeding and general hunting area demarcations.

The hunters set out and executed the plan on their next hunting trip. When they returned, the whole village was flooded with pigs so they adopted the plan ever after. The man who came up with the proposal for the hunting plan was hailed as a local hero and there was much celebration with pork.

There is no account if the plan on the bark of a tree was updated or reproduced. This is the only record that shows some form of traditional practices of producing maps for communication and education but mainly for hunting purposes by this particular group. It was not by logical thinking for development to enhance communication but circumstantial for a situation in time. This practice could be safely said to be the most innovative to other practices listed above.

### **3. Organic Law of Papua New Guinea contains attributes of traditional spatial communication**

Reflections of traditional principles of spatial "landmark" communications are incorporated in the Organic Law of PNG. One reason this is made possible is due to the significant diversion of topography and landform. General descriptions of metes and bounds that utilize spatial features and become legal documents are not uncommon in PNG.

For example, "Organic Law on Provincial Boundaries" [Revised Edition..., 1986] for Morobe province describes boundaries in the following words: "Commencing at a point being the intersection of the watershed of the Vailala-Tauri Divide with the common border between the former Territory of Papua and the former Territory of New Guinea at approximate meridian 145 degrees 42 minutes 30 seconds east longitude and bounded thence generally on the north-west by the said watershed of the Vailala-Tauri Divide generally north-easterly to the summit of Table-Top Mountain thence generally on the south-west and north by the watershed of the Kratke Ranges generally north-westerly and easterly to its intersection with parallel 6 degrees 42 minutes south latitude thence again on the north-west by a straight line north-easterly to the intersection of the middle thread of the Yati River ...".

Such delimitation of provincial borders is based on natural landmark such as rivers, valleys, mountains, bays et cetera and slightly formulized by geographical coordinates.

Other similar descriptions are survey boundaries and technical boundary descriptions. A survey technician, draftsman/draftsperson or cartographer normally writes these descriptions. The descriptions are checked for technical accuracy and approved by authorities to become legal documents. All legal boundaries of different types have descriptions that use spatial prominent natural and cultural topographic features. Examples are like forest concession boundaries, property survey boundaries, mining lease boundaries, coastal zone boundaries and all other forms of legal boundaries. The advantage of having written boundaries is realized when destroyed or lost plans are needed to be reconstructed.

### **4. Papua New Guinea today in the Sphere of Cartography - Cartographic Institutions**

To evaluate all cartographic institutions in PNG require a detailed survey for a national coverage, however, a preliminary count is made here with broad descriptions to give an indication of the current situation.

#### **4.1. Educational Cartographic Institutions**

During the colonial era and even after independence in September 1975, there were not many cartographic institutions in PNG. There were a few technical colleges offering drafting courses and Bulolo Forestry College in the Morobe province was offering courses in drafting and basic principles of cartography for forestry mapping applications.

The country was young and most of the skilled cartographers and draftspersons were expatriates. Most nationals worked under the expatriates and competent nationals were sent abroad to gain further skills and knowledge. It was only some years after independence when cartographic education was fully established, first in Bulolo Forestry College. Later, the course was transferred to Lae when University of Technology was inaugurated. Several other institutions that offer courses in drafting and basic principles in mapping/cartography

are technical colleges like Lae, Goroka, Rabaul, Port Moresby and a few others. The length of courses vary from 6 months to 12 months for technical colleges and 2-4 years for PNG University of Technology (Unitech). All the educational cartographic institutions are state run.

*Professional cartographic education* is available at Unitech. The Department of Surveying & Land Studies offers several courses including Cartography. Bachelor of Technology in Cartography is a four-year degree course while Diploma in Survey Drafting is a two-year course. Admission to Bachelor of Technology in Cartography is performance dependent during the third year. Those who cannot proceed graduate with Diploma in Survey Drafting. Department of Surveying and Land studies also offer degree, diploma and certificate courses in surveying and land studies. Other students from neighboring countries (Tonga, Vanuatu, Solomon Islands, Kiribati, Western Samoa, Palau) come to study in PNG University of Technology

The cartography course in Unitech has gone through a number of structural and curriculum changes over the past years. The reasons for these changes vary depending on what was considered important at the time. The present cartography programs are the result of changes instituted in 1996. The rationale for changes is to address the pressing quality issues relating to education and training of cartographers and surveyors. The time is right to implement changes to cartographic curricula and introduce teaching methods that will affect the next generation graduates.

Following are the underlying principles considered in making the changes to the present courses.

- The courses are not recognized regionally at an appropriate level. There is no formal accreditation process for the courses from professional or academic bodies. Surveying and Cartography graduates from Unitech are no longer considered to be at an appropriate entry level for some postgraduate studies in Australia. The Institution of Surveyors Australia does not recognize the Degree as a sufficient educational qualification for membership of that organization.
- Discussions with private and public sector organizations reveal the general opinion that our graduates are not of an acceptable standard. In fact, most commentators believe that the standard has dropped markedly over the last few years.
- Cartography and surveying are greatly affected by technology changes especially in work practices, in equipment, computational methodologies and in management practices. Additionally, the market is demanding a wider product range from the profession.
- In summary, there is a quality problem exacerbated by the number of unsuitable students proceeding to degree level. The industry PNG's profile showed that the demand for cartographers is steady over time. The industry demands a consistent academic level from all graduates. But due to limited spaces offered at PNG University of Technology, fewer applicants for intake, financial difficulties et cetera are some constraints for low output of graduates in cartography.

#### **4.2. Government non-educational cartographic institutions**

Taking stock of all the major cartographic and associated institutions in the industry, there can never be an institution that is purely cartographic. All institutions mentioned here have some relation to geoinformation production in varying degrees.

The three main groups of geoinformation organizations in the industry are government, private and the in-between, so-called statutory organizations. All their activities are product and services oriented for commercial purposes.

Government departments and agencies that involve in facilitating cartographic products and services wholly or partly are: National Mapping Bureau (NMB) in Lands Department, Works Department, Village Services, National Census Division, Department of Transport and Civil Aviation, Department of Agriculture and Livestock (DAL), Department of Environment and Conservation (DEC), National Housing Corporation (NHC), Electricity Commission (Elcom), National Forest Service (NFS) and more.

National Mapping Bureau is a National Mapping Organization. It is responsible for providing foundation and framework data on a national coverage. The foregoing are some examples of institutions that have some degree of cartographic functions within their operations.

#### **4.3. Data sets officially available**

There are many data sets in PNG appearing sporadically with no central coordination currently available in different organizations in both public and private sectors. There is no active control in acquisition, storage, processing, presentation and dissemination of these geospatial data. The processes are carried out on ad hoc or needs basis and in many cases result in data duplication and redundancy where the same data has been collected separately for different purposes.

Topographic maps at the scale of 1:100,000 created by Australian Skai Piksa Program in the middle of 1960's and plotting in the beginning of 1970's are still main hardcopy topographical source in PNG. Generalized

topographic maps at scales of 1:250,000 and 1:500,000 were compiled from 1:100,000 base series. Selected topographical maps at scale of 1:50,000 are available for some urban centres of PNG.

National Mapping Bureau (NMB) provides foundation and framework data for the whole country at different scales and formats. The hardcopies of topographic maps were digitized by NMB and updated for some selective sites of PNG. Digital topographical maps are available in MapInfo table (.tab) and MicroStation design (.dgn) formats at the scales of 1:50,000; 1:100,000; 1:250,000; 1:500,000.

PNGRIS (PNG Resources Information Systems) database is foundation for resource mapping and generation of additional databases in PNG. CSIRO of Australia developed this system through AusAID funding. PNGRIS was launched in 1994. PNGRIS source scale is 1:500,000, NMB topographic data set was used as a base map. PNGRIS is mapped on a spatial mapping unit called RMU for resource mapping unit. RMU is based on homogenous characteristics like landform, altitude, slope, vegetation type, rainfall etc. This data set is the main source of resource information in PNG and was initially developed for and used by Department of Agriculture and Livestock.

Similar approaches resulted in the creation and launching of other resource databases like FIMS (Forestry and Inventory Mapping Systems, 1:100,000), Mapping Agricultural Systems Projects (MASP), Land Administrative GIS (LAGIS), Biorap (Department of Environmental and conservation). These data sets cover the whole country and some layers are based on PNGRIS database.

## **5. Considerations of Internet Map Design for PNG user**

The modern Internet technology could help to increase the level of general and professional cartographic education in PNG. Currently, cartography students in Surveying and Land Studies Department in Unitech have courses in cartographic Web page design and publishing.

The meaning of design process in cartography is different to the design process of software, where design is the stage of creation between conceptual modeling and programming. In cartography, design is a process of creating visual forms by graphical methods. The process of cartographic design is rather subjective, especially, concerning the design of thematic maps.

There is a set of design principles. The contents of these principles offered to the various professionals will not sometimes be coordinated among themselves. Therefore, it is impossible to name these principles as rules. For cartographers, the most important principles of design are like legibility, visual contrast, figure-ground organization, hierarchical organization [Dent, 1985; Robinson et al, 1995]. Though realization of the developed principles of cartographical design frequently envy from set of controls and use these factors to estimate by the cartographer-designer, nevertheless, the factors, the principles and the contents of these principles are enough to develop many situations for design of "paper" maps.

Quite lawfully it is assumed that for designing computer maps, it can be necessary to apply both, new principles of design and reconsideration of the contents of traditional principles. The principles of design of screen maps can differ from the principles of design of paper maps for many reasons. Firstly, the different principles of formation of images as well as the principle of perception by the human eye of images from hardcopy and from screen. Screen image is formed through transmission of light through the screen; image on a paper map is formed from reflection of light on the map surface. Conditions of usage of such maps can have different influence on their perception and design. Also, technical restrictions of display maps, such as size of screen, resolutions et cetera are different than restriction on paper maps, for example, static character of pictures. Computer maps involve more visual variable than paper maps.

Design of computer maps within new media like Internet can add new requirements to the principles of design. First, in connection with interactivity of such maps, speed in reproduction of images, multi-platform of users, capacity of hardware. Interactive map is only a result of visualization of spatial data. Data itself contains deeper "spatial knowledge" than its image slice.

Bertin's visual variables are used for designing traditional "paper" maps. Visual variable bring in the distinctions among cartographic symbols on a map. There are nine variables: size, form, orientation, color (hue, value, chroma), pattern (arrangement, texture, orientation). With computer mapping, it is possible to use new dynamic visual variable like pace, duration, sequence, frequency [Kobben et al, 1996], and sound.

Not all visual variables are appropriate for designing computer maps. For example, size, form and pattern do not work well for distinction of differences between objects on display, due to low resolution of display. Their application is limited. Prominent visual variable on a computer map is color in RGB model. The gamut of colors on the display is larger than gamut of printed colors. A large part of this difference lies in the greater brightness of screen colors.

Optimal map design guidelines are needed for best perception by users with little or no experience in reading traditional paper maps. These are some basic principles of design to be adopted with local conditions and connotations.

For example, it is possible to assume that, for inexperienced users it is better to use pictorial or mimetic conventional signs, and not abstract, geometric or expressive symbols. Abstract conventional signs could be chosen according to natural association accepted for a designation of objects of an area. But in PNG, where there are more than 700 cultural groups, this task is difficult to be executed for mutual perception and understanding. On the other hand, computer maps with pictorial symbols do not satisfy the principles of harmony and clearness of image. Such symbols usually occupy a lot of space on a map and appear exaggerated.

The use of patterns on computer maps is not so desirable. Their reproductions on the rather rough resolution irritate the eyes and looks coarse. Using patterns with a pictographic arrangement for the background is possible on maps for symbolization of areal qualitative data. Arrangement of such patterns can be used for traditional ornaments of the appropriate provinces or clans. Such approach can help for better orientation and cognition on a map.

Thus, from traditional visual variable, there is only color with its properties to be successfully used for design of screen maps. Hue conventions and symbolic connotations of hue can be taken into account for choosing colors for map design and appearance on corresponding web page. Green color of a different chroma and value, probably, will be dominant for design of many thematic maps of PNG, as the large part of the country is covered with forest. To use «natural color» for the unprepared user, this can be the best approach. Tints of brown, cinnamon and gray color can be used to portray mountainous areas, various tints of blue color for water surface of fresh and salty reservoirs. Mixture of dark blue and green color can be used for swamps. Yellow color in Papua New Guinea frequently associates with something pleasant or nice. This color can be used for displaying towns and cities as they associate with a place of income.

Color preferences - color that people prefer to use. So if analyzing colors to be used for designing information media, colors of the national flag of PNG is easily noticed, that Papua New Guineans love dark colors from blended hue progression - such as brown, brown-red, black, dirty yellow, brown-green. These colors can be used for design of maps and appropriate web pages. It is not a good choice to use dark colors, such as brown, brown-red and black for background if symbols and text used are lower-value color. For background, it is better to use low percentages of screen tints. High percentages of screen tints are suitable for symbols and texts. It is possible to use white, yellow, light-blue, red, and green colors for symbols and texts. Yellow color has high visual acuity for a background, but it has an advancing visual effect, which is desirable for foreground figure.

Texts play a gamut function on maps. Correct use of size, style, form and color for labeling and symbolization on maps and legends in computer environment is not a simple task. Texts size less than 7 points are not legible. Types with the highest readability on the screen are sans serif fonts (like Verdana or Tahoma). The ability for discriminating visual hierarchy of type on a computer map is limited.

Computer environment gives more opportunities for use of light text on a dark background. Such text, as well as symbols, can seem slightly more on the sizes, and the lines are wider due to irradiation effect.

Computer maps on Web must be harmonious to be included in the design of web pages. Like paper maps, screen maps can contain several elements of a map composition such as subject area or actual map and explanatory aids such as titles, legends, insets, scales, border and orientation indicators. These additional elements are also a subject of map design. Interactive computer maps can contain additional elements of map composition. Such elements are like button tools for navigation and identification; field for scales; text input fields for searching on a map, ordering and other lists, check boxes, selection form or directory structure for navigation through web pages containing cartographical information.

One of the main principles of map design composition is visual balance as a whole. As it is necessary to execute, design of each component is shown on cartographic web page.

The principle contents of mutual positioning of design units can differ from traditional guidelines, as formats of layouts in many respects, are predetermined by the shapes and sizes of monitor screens. The prevailing format can be landscape (if web the page consists from one frame), and the sizes of subject area and full outlaying are limited to the standard sizes of a working field of screens.

For inexperienced users, it is desirable to show all basic elements of map composition, as map orientation by the top edge to the north, are not obvious to them. As it is necessary to accompany some map elements with explanation text or pictures, for example how to use a legend, tools, scale.

The basic guidelines of traditional cartography for the sizes and relative positioning of elements of map compositions can be, in general, preserved with some changes. For example, the interactive tools, as an element of composition, take precedence after subject items like subject area and legend.

Positioning and relative size of elements of map contents composition, in general, should obey the traditional guidelines. The size of subject area should be the largest map in comparison to other elements, and should be placed in the middle of map composition at optical center, if there is an outline. If the “floating” configuration is chosen, subject area can be horizontally aligned on the center of the frame. The title of map can be as the title of web page and consequently in most cases, will be placed at the top of page or frame and centered. The size of legend and tools should be less subjective and can be placed to the left, right or under the map and the legend can

be shown in a New Window. Minor elements, such as scale, orientation etcetera, should not attract attention by their sizes. Traditionally, it is better to place scale to the bottom of a map, direction - top right. Some tools on cartographical web pages can be placed in contents frame or in a new window, pop ups, user defined and floating legends.

The design of a legend and scale of a computer map can be different from the traditional approaches. The basic requirement to design a map legend is the map symbols in a legend should unequivocally match the map symbols on the map. This rule has to have priority especially for static computer maps without tools of identification. For interactive maps, which provide user tools for change of cartographic symbols and symbolization methods, the predefined pallets for visualization can be offered.

Scale of static computer maps can be shown only as bar scale, the style of graphic scale is dictated by the contents of a map. For an interactive screen map scale can be represented as graphical, and as fraction in a query result field. It is necessary to give an explanation on how to use scale for measurements on maps.

The map composition can be separated from other contents of the web page by a border or can have "floating" composition. In the latter case it is necessary to correctly choose a background for a map and for its whole web page.

The screen map gives large opportunities to accommodate inserts. Inserts can be placed in specific sections of the same frame or current web page or on a new web window and to be connected to parent map by hyperlinks.

The techniques for creating PNG cartographic sites can be chosen from the point of view of the following factors:

- For inexperienced user, it does not matter which techniques are used for operation of map server and client sites, simplicity of usage and familiarity of user interface are more important.
- Effectiveness of usage of web map application - download time, hardware and software requirements, accessibility and services of the server side.

In accordance with the factors for web map publishing with conditions like limited and unstable network resources and inexperienced users, it is better to use techniques which give possibilities to customize user interface with regards to audience and purpose of mapping.

The usage of client-side solution such as Java, ActiveX and Scripts can give more independence from server side and complex GIS-oriented commercial software interfaces. These approaches give possibilities to build help functions and tutorials into the map viewer. Commercial Internet map servers with GIS request brokers architecture usually are very costly concerning the server-side software and not affordable in PNG. Some software for client-side solution can be available free of charge, others can be custom-made at relatively nominal cost.

## **Conclusion**

This paper focused on alternate communication options for PNG application to improve spatial understanding and improve map literacy. Numeracy, literacy and graphicacy were all listed as important modes of communication link in PNG where diverse traditions and languages exist. PNG's history and development from the colonial era was briefly discussed to set the perspective for communication transition and development. Investigations revealed verbal communication as the main traditional practice in PNG with a few variations involving signs and symbols to suit local conditions with an interesting case for hunting from Markham in Morobe province. The study also revealed that there was no significant development in graphic communication and different cartographic institutions operate in isolation with no central coordination on data acquisition, storing, processing, presentation and dissemination. Educational cartographic institutions and types of courses offered in PNG were mentioned. Introduction of web map development in the Surveying and Land Studies department for cartographic education attracted much discussion. The different cartographic design options for spatial communication and education were discussed considering the limitations and possibilities available in the context of web application for static and dynamic internet mapping. In the long term, map literacy is expected to improve to support spatial decision-making towards development. The authors believe that levels of activities in geoinformation industries, exposure to available and disseminated data and information on geoinformation and applications, affordability, accessibility and willingness to change are some factors that would be used to measure geospatial application and map literacy rate. In a developing country like PNG with a population of 4 million and over 700 languages with the bulk of the population in the rural areas, it still remains an interesting challenge.

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