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SPATIAL MODELING OF LANGUAGE VARIATIONS IN THE NORTH COASTAL OF SUBANG DISTRICT: GEOLINGUISTIC STUDY

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Abstract

This article aims to describe the spatial modeling of language variations in the North Coast of Subang Regency, West Java using a geographic information system (GIS) in geolinguistic studies. This research uses the method of analytical descriptive with the technique of applying the GIS function as a supporting tool for analysis. The analysis of language variation was based on 448 Swadesh lists that had been modified by the researcher. The data collected from the 37 villages were transcribed manually and then classified based on linguistic differences according to Guiraud and Mahsun. The variants that were originally recorded in the excel program were then transferred to the GIS program. Furthermore, the data is processed by changing the measurement results of spatial data and attribute data into data that is reliable in presenting data. The results of data processing show that the GIS analysis tool can visualize a geolinguistic map showing the topographical profile of observation points and the distribution of language variations in the North Coast of Subang Regency.

Keywords: spatial modeling, geolinguistics, geographic information systems, language variations

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MODELITZACIÓ ESPACIAL DE LES VARIACIONS LINGÜÍSTIQUES EN LA COSTA NORT DEL DISTRICTE DE SUBANG: ESTUDI GEOLINGÜÍSTICO

Resum

Aquest article té com a objectiu descriure el modelatge espacial de les variacions lingüístiques a la costa nord de la regència de Subang, Java Occidental, fent servit un sistema d'informació geogràfica (SIG) apta per a estudis geolingüístics. Aquesta investigació utilitza el mètode descriptiu analític amb l'aplicació de la funció SIG com a eina de suport. L'anàlisi de la variació lingüística s'ha basat en 448 llistes Swadesh que havien estat modificades per l'investigador. Les dades recopilades als 37 llogarets s'han transcrit manualment i després s'han classificat en funció de les diferències lingüístiques segons Guiraud i Mahsun. Les variants que es van registrar originalment al programa Excel es s'han transferit després al programa SIG. A més, les dades s'han processat canviant els resultats de la mesura de les dades espacials i les dades d'atributs a dades que són fiables en ser representades. Els resultats del processament de dades mostren que l'eina d'anàlisi SIG pot visualitzar un mapa geolingüístic que mostra el perfil topogràfic dels punts d'observació i la distribució de les variacions lingüístiques a la costa nord de la regència de Subang.

Paraules clau: modelització espacial, geolingüística, sistemes d'informació geogràfica, variacions lingüístiques

MODELADO ESPACIAL DE LAS VARIACIONES LINGÜÍSTICAS EN LA COSTA NORTE DEL DISTRITO DE SUBANG: ESTUDIO GEOLINGÜÍSTICO

Resumen

Este artículo tiene como objetivo describir el modelado espacial de las variaciones lingüísticas en la costa norte de la regencia de Subang, Java Occidental, utilizando un sistema de información geográfica (SIG) para estudios geolingüísticos. Esta investigación utiliza el método descriptivo analítico con la aplicación de la función SIG como herramienta de apoyo. El análisis de la variación lingüística se ha basado en 448 listas Swadesh que habían sido modificadas por el investigador. Los datos recopilados en las 37 aldeas se transcribieron manualmente y luego se clasificaron en función de las diferencias lingüísticas según Guiraud y Mahsun. Las variantes que se registraron originalmente en el programa Excel se transfirieron luego al programa SIG. Además, los datos se han procesado cambiando los resultados de la medición de los datos espaciales y los datos de atributos en datos que son fiables en su representación. Los resultados del procesamiento de datos muestran que la herramienta de análisis SIG puede visualizar un mapa geolingüístico que muestra el perfil topográfico de los puntos de observación y la distribución de las variaciones lingüísticas en la costa norte de la regencia de Subang.

Palabras clave: modelado espacial, geolingüística, sistemas de información geográfica, variaciones lingüísticas

1. Introduction

In the mid-twentieth century, computer and software technology advances introduced novelties in language mapping. Language mapping is shifting from simply representing language distribution to measuring change and analyzing language

patterns. For more than a century, linguists have used maps to describe the spatial characteristics of different languages in various locations and examine the processes that might lead to language change. Maps, being a powerful analytical tool, are invaluable for decoding, indexing, and interpreting data collected in the field (Luebbering, Kolivras & Prisley 2013b; Wikle & Bailey 2010).

Researchers routinely collect language data to identify patterns of each variant. This data is usually published in the form of atlases (Allen 1976, Kurath 1972, McDavid Jr. & O'Cain 1980, Southard 1983, Upton & Widdowson 1996). Language atlases created with traditional mapping are labeled as boring (Williams & Ambrose 1992), obsolete (Brougham 1986), very simple (Mackey 1988), and lack of creativity (Williams 1996). Most of these maps use different geometric dot symbols to represent each variant of a word with the same meaning. They usually determine the distribution, pattern, trend, concentration, and isolation of words used by each informant in the same area. These maps depict one language in a place and only show how different one area is from another (Luebbering Kolivras & Prisley 2013a). Sometimes data is collected at only a few locations and is represented by points that are considered to represent all administrative-territorial units (Sibler, Weibel, Glaser & Bart 2012). The lines on the map that mark the boundaries between linguistic features are also used to indicate the geographical boundaries of words, grammatical structures, and sounds, but these lines are drawn arbitrarily (Bartlett 1992, Davis 2000, Kretzschmar 2003, Matthews 1997). These lines are called isoglosses. Finally, the language maps remained relatively unchanged from edition to edition despite continuous linguistic changes (Luebbering 2013).

Manual cartography is now much assisted by computerization so many digital maps are found. This digital map is processed using a geographic information system (GIS). Compilation of this computer-based map can be completed in a short time with the acquisition of relatively more maps compared to traditional mapping. Computerization in the field of mapping is a tool to speed up the work of compiling maps. In addition, computerization can also save space in preparing maps with a large

number of sheets, compared to conventional ones. Tools in the field of mapping continue to develop in line with developments in science and technology.

The emergence of geographic information systems (GIS) in the 1960s has proven to be a very powerful tool for handling spatial data, especially for data storage, database management, spatial analysis, and cartographic display. The application of GIS to linguistics has been made over the last few decades, for example, by the work of Lee & Kretschmar (1993), Luo et al. (2000), Wang et al. (2006), Ayad & Luthin (2006), Onishi (2010a), Teerarojanarat & Tingsabadh (2011b), Jalaluddin (2015), Wiyanti et al. (2019).

Lee & Kretschmar (1993) describes the application of quantitative spatial analysis and GIS functions to the analysis of language data using the extensive *Linguistic Atlas of Countries of the Middle and South Atlantic* (LUMAS). This is a brief review of recent developments in the use of quantitative and statistical methods to analyze linguistic data using GIS in language mapping. Luo et al.'s research (2000) used GIS to help visualize the settlement patterns of the Tai minority group in South China. Next, the research study by Wang et al. (2006) as a pioneer in using GIS mapping and spatial analysis in historical linguistics through spatial interpolation functions (e.g. spatial smoothing and trend surface modeling) to help reconstruct the past settlement of Tai from place names in South China and Southeast Asia.

Based on a survey of Western Pennsylvania dialects conducted by the English Department at Clarion University, Ayad & Luthin research (2009) utilizing the advantageous GIS function of the cartographic display to combine with social factors, such as age, gender, occupation, level of education for dialect distribution mapping in the study area.

Onishi (2010b) has formed isogloss based on dialect population variants symbolized in the map with the help of GIS through the choropleth technique. This choropleth technique is an area-marking technique that represents each lexical variant found in the research area. Next, Teerarojanarat & Tingsabadh's research (2011a) related to the lexical variant of the Thai dialect. In this research, GIS technology has been used which is useful for forming Thai dialect isoglosses based on overlay rules. This overlay rule is an important procedure in the analysis of geographic information

systems (GIS). Thus, it can be said that this overlay rule is the ability to place a graphic on one map over another map graphic and display the results on a computer screen. It can be concluded that this overlay can display a digital map on another digital map along with the associated attributes in it, and can produce a combined map of the two that has attribute information from the two intended maps.

Wiyanti, Fadlilah & Sugito (2019) conducted language mapping in Cirebon District with the GIS software, Archmap 10.5. The mapping process is carried out in three processes, namely measurement or data collection, processing of measurement results data, and data presentation.

The language variation map is in the form of a 2D map displaying 208 glosses spread across Cirebon Regency. This map uses geographic coordinates at a scale of 1: 220,000 which are visualized on a numerical scale and a graphical scale.

Jalaluddin (2015) studies dialect lexical variants in Perak based on regional boundaries and has produced a map of the distribution of pronouns (KGN) in the North Perak area, the Perak River Coast, as well as the spread of the Patani Malay dialect in North Perak. Wikle (1997) has made a breakthrough, namely by conducting a three-dimensional "fishnet" mapping in visualizing language data. Lee & Kretzschmar (1993) introduce a different method of quantitative spatial analysis, namely performing dot pattern analysis and combined statistical calculations in analyzing LAMSAS data. Other researchers apply spatial statistical methods, including kernel density estimation and spatial interpolation to visualize variation in one or several linguistic features (Rumpf, Pickl, Elspaß, König & Schmidt 2009; Sibler et al. 2012).

Another breakthrough was made by Thebpanya & Hatfield (2016) which explores the spatial pattern of lexical variation in the Chiang Mai dialect through a three-dimensional (3-D) map of linguistic diversity. Linguistic differences were documented and data were interpolated using the usual kriging approach. Fieldnote data were analyzed via thematic coding and spatial analysis with ArcGIS 10.2 (ArcMap 10.2, 2014, Environmental Systems Research Institute, Redlands, California). The linguistic differences found are visualized through a three-dimensional map associated with the topography of each speech area.

The reason for choosing Pesisir Subang is that research results related to language mapping in the region have not yet been found. The researcher only found research on one of the sub-districts in Pesisir Subang using the Geographic Dialect approach. The research is entitled Javanese in Blanakan District, Subang Regency: Geographical Dialect Studies (Ayu 2014). Of the 9 villages in the Blanakan sub-district, Ayu only took 6 villages which included: Blanakan Village, Rawamekar Village, Cilamaya Hilir Village, Tanjung Tiga Village, Jayamukti Village, Langensari Village. The six villages are considered to represent the nine existing villages. The results showed that the Javanese and Sundanese vocabulary were used by the people of Blanakan District. The results of the mapping show that the distribution of vocabulary elements in the Blanakan District is different. Most of the Javanese vocabulary is widespread in the villages studied but not so in the Sundanese-influenced villages. There is an element of language which is the local language, in this case, Javanese. There are also language elements that are borrowed from other languages, namely Indonesian and Sundanese. Mapping by Ayu is still manual, not yet use a geographic information system. From the results of Ayu's research, it was concluded that the mapping and description in other coastal areas of Subang Regency had not been carried out. There are also language elements that are borrowed from other languages, namely Indonesian and Sundanese. Mapping by Ayu is still manual, not yet use a geographic information system. From the results of Ayu's research, it was concluded that the mapping and description in other coastal areas of Subang Regency had not been carried out. There are also language elements that are borrowed from other languages, namely Indonesian and Sundanese. Mapping by Ayu is still manual, not yet use a geographic information system. From the results of Ayu’s research, it was concluded that the mapping and description in other coastal areas of Subang Regency had not been carried out.

Pujilestari (2009) researched the geography of regional language dialects in Binong District, Subang Regency, West Java Province. The results show that in Binong District there are Sundanese and Javanese languages. The phonological analysis found language variations in the form of apheresis, syncope, apocope, prosthesis, epenthesis, and paragoge. There are also variations of vowels and consonants, vowel and consonant clusters, and consonant and vowel contrasts from the Binong District

dialect. There is a distinctive element of the regional language in Binong District which occurs due to language variations in the form of prosthesis and epenthesis. In mapping, at observation points 3, 4, 5, 6, and 9, the majority speak Sundanese, and at observation points 1, 2, 7, and 8 the majority use Javanese. Mapping conducted by Pujilestari is still traditional, not yet utilize a geographic information system.

Another research was conducted by Wahya & Meilinawati (2011). They studied Sundanese in Kediri Village, Binong District, Subang Regency, West Java, based on Geolinguistic Studies. The results of his research show that Sundanese in Kediri Village, Binong District, Subang Regency is a geographical variation of Sundanese that grows dynamically. This can be seen from the discovery of elements of innovation, both internal innovation and external innovation. This innovation was triggered by the linguistic situation in the village, including the bilingual people. Based on the results of observations, internal innovation and external innovation occurred. The vocabulary that shows internal innovation is more than the vocabulary that shows external innovation. In terms of internal innovation, Vocabulary showing form innovation is more numerous than vocabulary showing meaning innovation. In terms of form innovation, the vocabulary showing full lexical innovation is greater than the vocabulary showing partial lexical innovation or phonetic innovation. As for external innovation, the vocabulary absorbed from the local Javanese language is higher than the Indonesian vocabulary. Wahya & Meilinawati's research were only on the use of Sundanese and the area of observation was not included in the coastal area of Subang Regency. As for external innovation, the vocabulary absorbed from the local Javanese language is higher than the Indonesian vocabulary.

Rosviana, Sudaryat & Haerudin (2019) examined the linguistic situation of the majority of the people of Ciasem, Subang Regency. The method used is descriptive with observation and interview techniques. The research instrument consisted of 200 Swadesh words and 377 cultural vocabulary. The data were analyzed by comparing the Sundanese and Javanese dialects. The results of the study show that the Sundanese and Javanese languages are well mastered by the Ciasem people in communicating.

Wiyanti et al. (2019) have made an inventory of isolects in parts of the Subang Coastal area, namely in Legon Kulon and Pusakanagara Districts. The results of the inventory show that the various languages used by the people there are Sundanese and Javanese. Wiyanti et al. suggest doing language mapping in the area and its surroundings. Apart from that, it is also advisable to examine the uniqueness of utterances at the level of accent, tone, intonation, and tempo. The speech coded by the community sometimes overlaps the use of accents. At a glance, it is heard that the community speaks Javanese vocabulary with a Sundanese accent or conversely that Sundanese vocabulary is spoken with a Javanese accent.

Based on a review of previous references, studies on language mapping used by the people of the coastal areas of Subang Regency based on geographic information systems have never been conducted so the linguistic conditions in the area have not been seen. Therefore, this research is important to do. The researcher conducted an inventory, identification, and mapping of language conditions under the umbrella of geolinguistic research using a geographic information system.

2. Method

The method used is descriptive with field survey techniques, direct recording, recording, data transcription, and applying the GIS function as an analytical support tool. The research steps are as follows: (1) inventory of language variations at all observation points; (2) description of linguistic differences and peculiarities at the phonological, morphological, and lexical levels; (3) measurement of frequency, intensity, and duration using the Praat application; (4) 2D mapping using geographic information system (GIS) software, namely ArcMap 10.5. ArcMap 10.5 is one of the features of the latest version of ArcGIS Desktop. ArcGIS is an application developed by ESRI (Environment Science & Research Institute). ArcMap can visualize, edit, create thematic maps, manage tabular data (excel), select (query), and use Geoprocessing features to analyze and adjust data or create map designs. The instrument used is in

the form of Swadesh's basic vocabulary, which amounts to 448 words. The mapping process consists of data provision, data processing, and data presentation.

The areas that were used as observation points were Blanakan District, Sukasari District, Legon Kulon District, Pusakanagara District, and Pamanukan District. The selection of the five sub-districts was because Blanakan, Sukasari, Legon Kulon, and Pusakanagara were included in the coastal area (Taofiqurohman & Ismail 2012). The Pamanukan District was chosen based on the position of the Pamanukan District between Sukasari District and Pusakanagara District. In addition, the language conditions at the observation points have not been visualized in map form, either manually or digitally.

3. Results and Discussion

Mapping said base map. In general, a map is a conventional depiction of the earth's surface which is flattened in a two-dimensional form that has certain features such as scale, legend, and so on (Wiyanti et al. 2019). The addition of pe-an affixation causes a change in meaning, namely the process of making maps. Maps have been known since civilization even hundreds of years BC. At its inception, maps were simple forms of symbolic representation of the earth.

Based on the etymology, the map comes from the Greek mappa which means table cover. A map represents a collection of data and information according to its location in two dimensions (Ahaliki 2018). The International Cartography Association (ICA) defines a map as a scaled image on a flat medium of the appearance of the earth's surface or other celestial bodies (https://www.bola.com/variety/ read/ 4613704/ understanding-map-function-purpose-of-the-element-and-how-to-make it).

Mapping is the process of measuring, calculating, and depicting the earth's surface using certain methods and/or methods so that the results are in the form of softcopy or hardcopy maps in vector or raster form. In line with advances in science and technology, the field of mapping is experiencing good progress. Geographical data

collection is manually strengthened by technology such as aerial photographs, satellite photographs, radar, and so on.

Along with advances in technology, especially in the field of computers, maps are not only presented in real form on a piece of paper (hardcopy) but can also be presented in digital form (virtual or softcopy maps). In this study, the mapping of language variations was carried out through digital mapping, namely making maps with the help of a computer. In addition to digital mapping, the advantage of this research is the application of the GIS function as a support for analytical tools using two types of data, namely spatial data and attribute data.

Spatial data in the form of research object locations based on the geographical position on the earth's surface using a coordinate system in the form of administrative boundary maps, contour maps, and observation point maps. Attribute data contains information from objects contained in the map that are completely unrelated to the geographical position of a particular object. This data includes sub-district names, village names, gloss data, and language variations.

The mapping process is grouped into three main processes, namely:

a. Measurement of data collection. This process is carried out by taking direct measurements in the field and remotely. In this study, an inventory of language variations in the North Coast of Subang Regency was carried out. Inventory is done by recording oral data. Oral data was obtained from everyday conversations. This language data becomes attribute data that supports GIS development. In particular, attribute data consists of (1) sub-district names and village names in the North Coast of Subang Regency; and (2) gloss and language variations. In addition to attribute data, spatial data is also required. In particular, the spatial data in this study consisted of (1) a map of the administrative boundaries of the North Coast of Subang Regency; (2) contour maps; and (3) a map of observation points.

b. Measurement data processing. Data processing is carried out to convert measurement data into data that is reliable or needed in presenting data. The spatial data used are the administrative boundary maps of the North Coast of Subang Regency, satellite imagery icon maps, contour maps, and observation point maps. The four data can be seen in the following figure.

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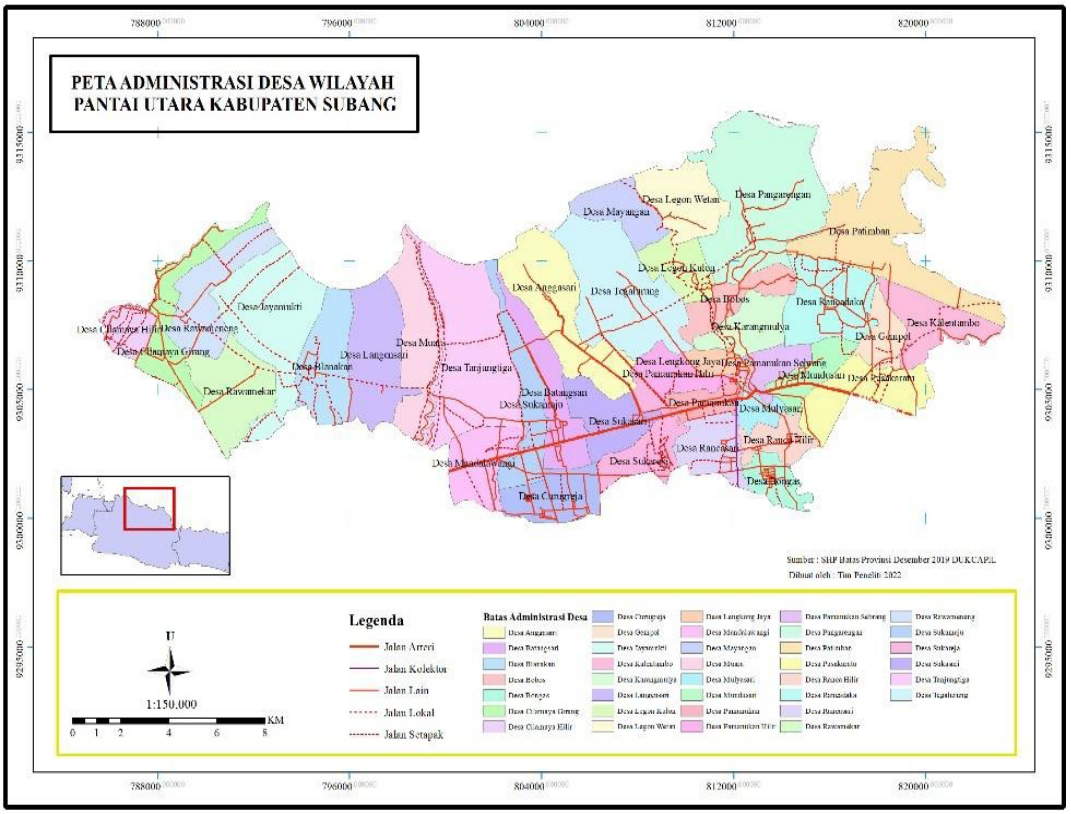


Figure 1. Map of the administrative boundaries of the North Coast of Subang Regency

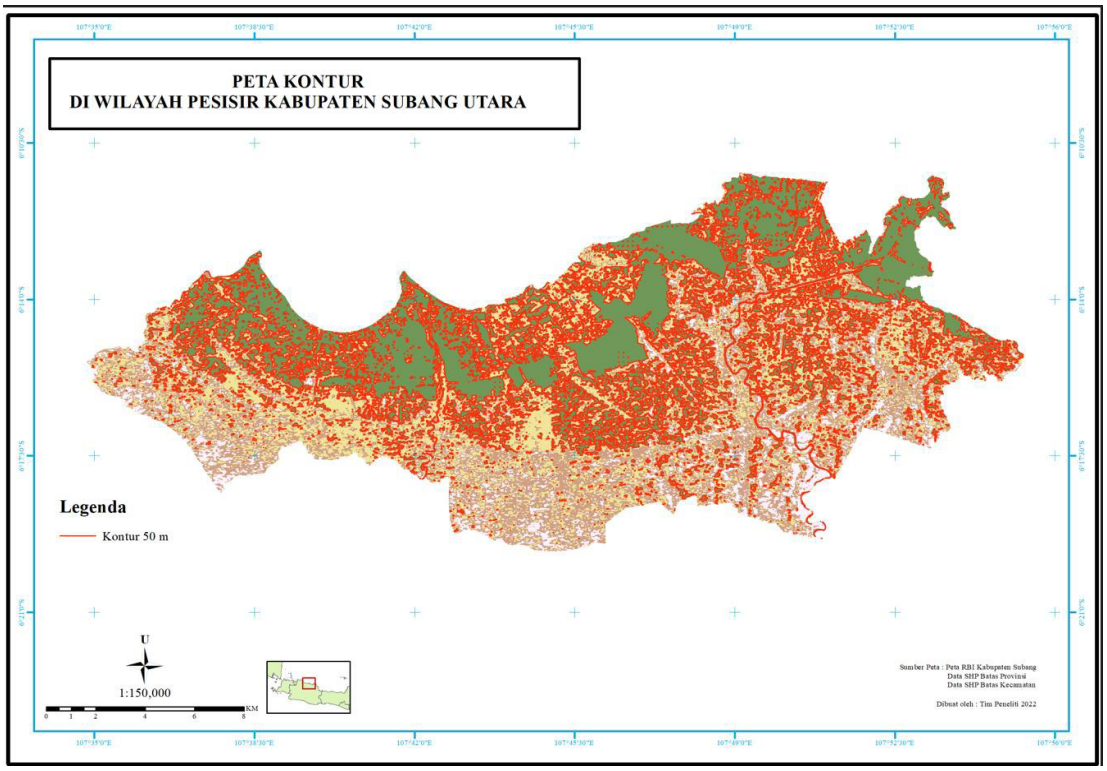


Figure 2. North Coast Contour Map of Subang Regency

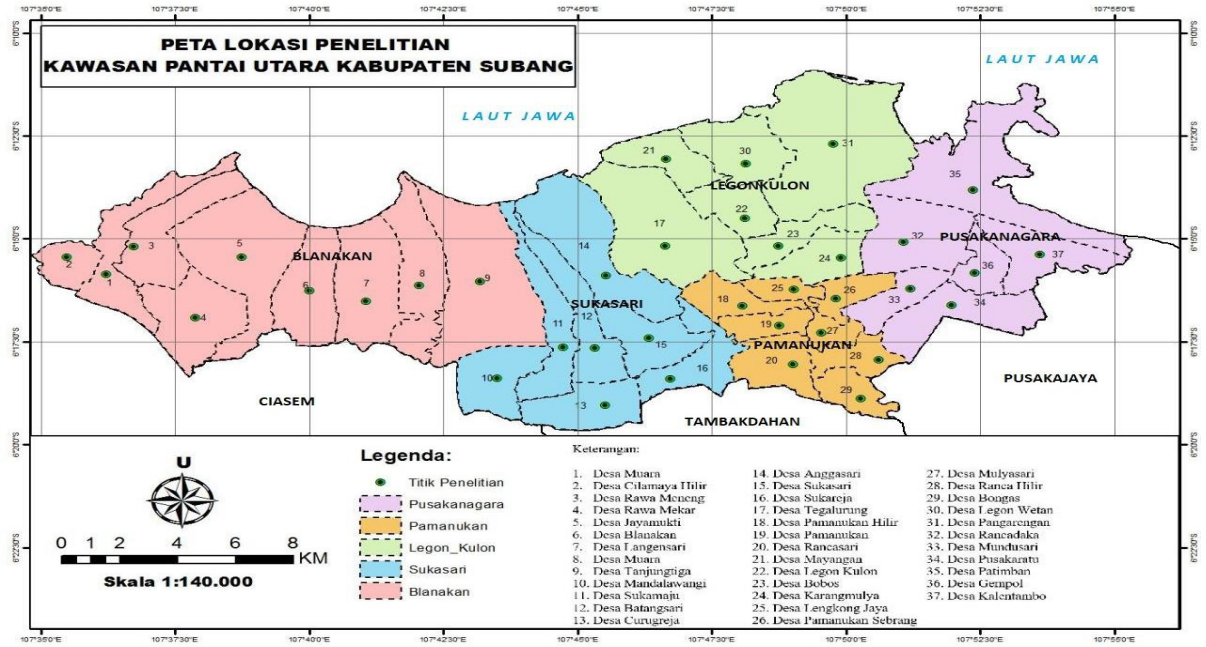
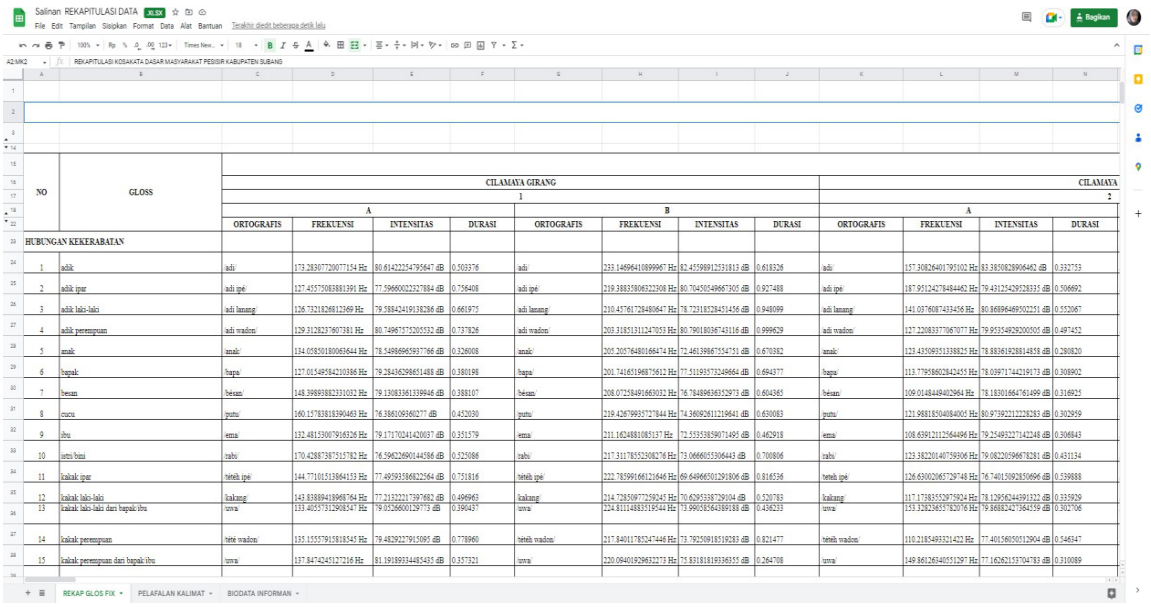


Figure 3. Observation Point Map

The results of an inventory of language variations obtained as many as 448 gloss data and their variations. The research sample consisted of 37 villages spread across the North Coast of Subang Regency. Gloss and cryptic data are tabulated into the database using the MS Excel application, which is the GIS input data. Due to the long and wide summary results table, the researcher presents the file drive link. The links are as follows:

<https://docs.google.com/spreadsheets/d/1W1DmifXfAUQ3TiyicpdZq56TiUU9Ktgj/edit#gid=1505808418>

The gloss database and its variations are visualized in the following figure:



Salinan REKAPITULASI DATA

REKAPITULASI KOSAKATA DASAR MASYARAKAT PESISIR KABUPATEN SUBANG

NO	GLOSS	CILAMAYA GIRANG 1								CILAMAYA 2			
		A				B				A			
		ORTOGRAFIS	FREKUENSI	INTENSITAS	DURASI	ORTOGRAFIS	FREKUENSI	INTENSITAS	DURASI	ORTOGRAFIS	FREKUENSI	INTENSITAS	DURASI
HUBUNGAN KEKERABATAN													
1	adik	adi/	173.2830772007154 Hz	80.61422254795647 dB	0.503376	adi/	233.14696410899967 Hz	82.45598912531813 dB	0.618326	adi/	157.30826401795102 Hz	83.3850828906462 dB	0.332753
2	adik ipar	adi ipé/	127.45575083881391 Hz	77.59680022327884 dB	0.756408	adi ipé/	219.38835806522308 Hz	80.70450549667305 dB	0.927488	adi ipé/	187.95124278484462 Hz	79.43125429528335 dB	0.506892
3	adik laki-laki	adi lanang/	126.73218268812369 Hz	79.58842419138286 dB	0.661975	adi lanang/	210.45761728480647 Hz	78.72318528451456 dB	0.948099	adi lanang/	141.03760874534567 Hz	80.86896469502251 dB	0.552067
4	adik perempuan	adi wadon/	129.31282376073811 Hz	80.74967575205532 dB	0.737826	adi wadon/	203.31853131247053 Hz	80.79018036743116 dB	0.999629	adi wadon/	127.22083377067077 Hz	79.95354928200505 dB	0.497452
5	anak	anak/	134.05850180063644 Hz	78.54986965937766 dB	0.526008	anak/	205.20576480166474 Hz	72.46139867554751 dB	0.670382	anak/	123.43509351338825 Hz	78.88361928814858 dB	0.280820
6	bapak	bapa/	127.01549584210386 Hz	79.28436298651488 dB	0.380198	bapa/	201.74165196875612 Hz	77.51193573249664 dB	0.694377	bapa/	113.77958602842455 Hz	78.03971744219173 dB	0.308902
7	besan	besan/	148.39893832331032 Hz	79.13083361339946 dB	0.388107	besan/	208.07258491663032 Hz	76.78489636352973 dB	0.604365	besan/	109.01484494032964 Hz	78.18301664761499 dB	0.316925
8	cucu	putu/	160.15783818390463 Hz	76.38610936502?7 dB	0.452030	putu/	219.42679935727844 Hz	74.36092611219641 dB	0.630083	putu/	121.98818504084005 Hz	80.97392212228283 dB	0.302959
9	ibu	ema/	132.48153007916326 Hz	79.17170241420037 dB	0.351579	ema/	211.16248810851?7 Hz	72.55535859071495 dB	0.463918	ema/	108.63912112564496 Hz	79.25493227142248 dB	0.306843
10	istri/bini	rabi/	170.42887387515782 Hz	76.59022690144586 dB	0.525086	rabi/	217.31178552308276 Hz	73.06660553064?3 dB	0.700806	rabi/	123.38220140759306 Hz	79.08220596878281 dB	0.431134
11	kakak ipar	tèteh ipé/	144.77101513864153 Hz	77.49593586822564 dB	0.751816	tèteh ipé/	222.78599166121646 Hz	69.64966501291806 dB	0.816536	teteh ipé/	126.63002065729748 Hz	76.74015092850696 dB	0.539888
12	kakak laki-laki	kakang/	143.83889418968764 Hz	77.21322217397682 dB	0.496963	kakang/	214.72850977259245 Hz	70.62953387291?4 dB	0.520783	kakang/	117.17385552975924 Hz	78.12956244391322 dB	0.335929
13	kakak laki-laki dari bapak/ibu	uwa/	133.40557312908547 Hz	79.0526600129773 dB	0.390437	uwa/	224.81114885519544 Hz	73.99058564389188 dB	0.436233	uwa/	153.32823655782076 Hz	79.86883427364759 dB	0.302706
14	kakak perempuan	tèté wadon/	135.15557915818545 Hz	79.48292279150?9 dB	0.778960	tèteh wadon/	217.84011785247446 Hz	73.79250918519283 dB	0.821477	tèteh wadon/	110.21854933214?2 Hz	77.40156050512904 dB	0.546347
15	kakak perempuan dari bapak/ibu	uwa/	137.84742451272216 Hz	81.19189334485435 dB	0.357321	uwa/	220.09401929632273 Hz	75.83181819336355 dB	0.264708	uwa/	149.86126340551297 Hz	77.16262153704783 dB	0.310089

REKAP GLOS FIX | PELAFALAN KALIMAT | BIODATA INFORMAN

Figure 4. Database of Gloss and Language Variations

c. Data presentation. Presentation or presentation of data is the final stage of the mapping process sequence. The data that has been processed is used as a source for making maps. In this study, the data is presented in the form of a map of language variations spread across 37 North Coastal villages in Subang Regency. The details of the 37 villages are as follows.

1. Desa Cilamaya Girang
2. Desa Cilamaya Hilir
3. Desa Rawa Meneng
4. Desa Rawa Mekar
5. Desa Jayamukti
6. Desa Blanakan
7. Desa Langensari
8. Desa Muara
9. Desa Tanjungtiga
10. Desa Mandalawangi
11. Desa Sukamaju
12. Desa Batangsari
13. Desa Curugreja
14. Desa Anggasari
15. Desa Sukasari
16. Desa Sukareja
17. Desa Tegalurung
18. Desa Pamanukan Hilir
19. Desa Pamanukan
20. Desa Rancasari
21. Desa Mayangan
22. Desa Legon Kulon
23. Desa Bobos
24. Desa Karangmulya
25. Desa Lengkong Jaya
26. Desa Pamanukan Sebrang
27. Desa Mulyasari
28. Desa Ranca Hilir
29. Desa Bongas
30. Desa Legon Wetan
31. Desa Pangarengan
32. Desa Rancadaka
33. Desa Mundusari
34. Desa Pusakaratu
35. Desa Patimban
36. Desa Gempol
37. Desa Kalentambo

Figure 5. Description of Research Observation Points

This map uses geographic coordinates, i.e. degrees, minutes, and seconds. The language variation map scale is 1:150,000 which is visualized on a numerical scale and a graphical scale. This map uses ArcMap 10.8. Maps can be presented in two types, namely analog maps (printed / hardcopy) and digital maps (softcopy). The following is an example of a map visualization of language variations in the North Coast of Subang Regency for younger siblings.

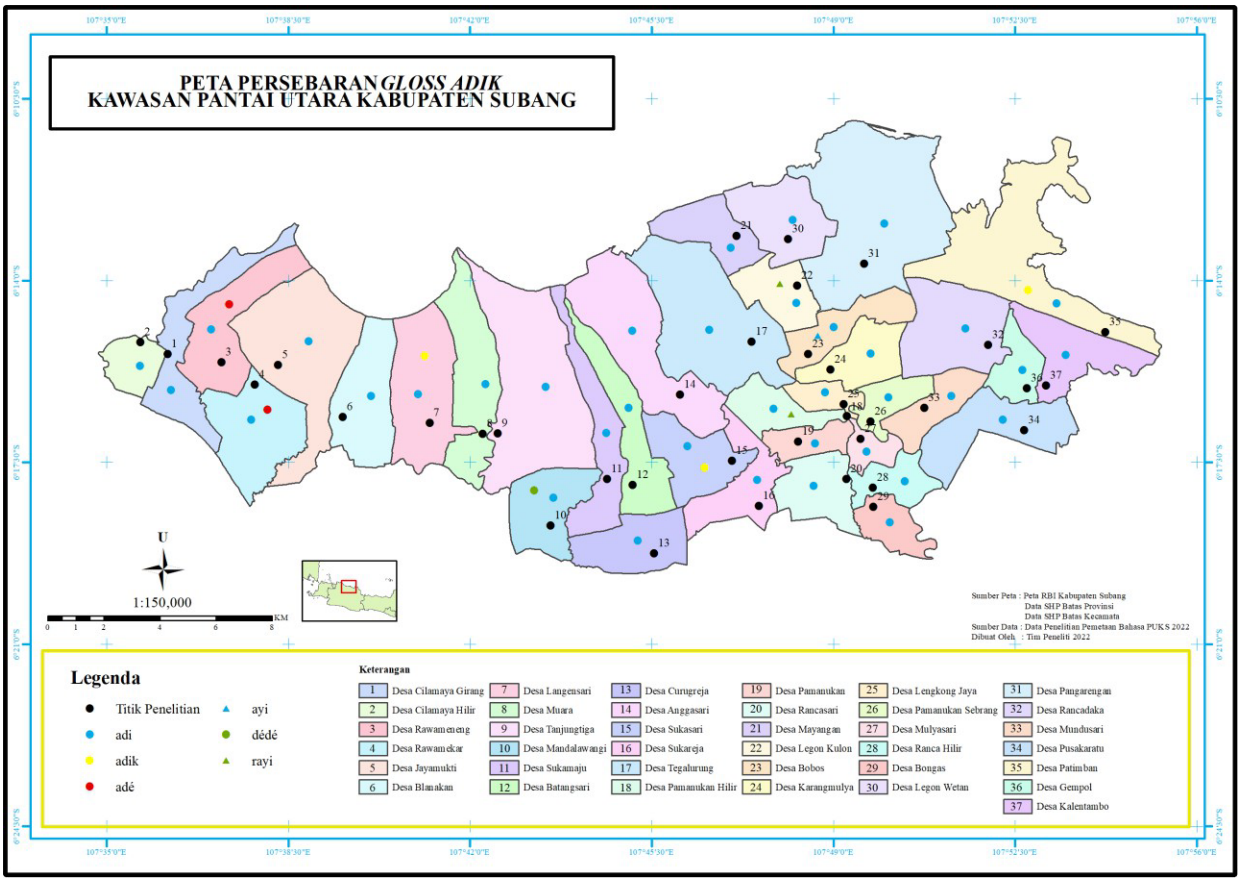


Figure 6. Distribution Map of Language Variations on the North Coast of Subang Regency

Based on the above mapping, it is known that there are six variations of gloss sister, namely *adi*, *ade*, *adik*, *dede*, *rayi* and ayi. *Adi* variation is used at observation points 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37. *Ade* variations were used at observation points 3 and 4. *Adik* variations were used at observation points 7, 15 and 35. Variations

dede is used at observation point 10. Rayi variation is used at observation points 18 and 22. *Ayi* variation is used at observation point 23. From the results of this study, mapping modeling through the application of geographic information systems (GIS) can provide information on language variations in the North Coast of Subang Regency and can be used as a mapping model in other areas.

4. Conclusion

Mapping is the process of measuring, calculating, and describing the earth's surface using certain methods and/or methods so that the results are in the form of softcopy or hardcopy. Mapping modeling through geographic information systems can visualize various types of thematic maps, namely administrative boundary maps, contour maps, and observation point maps. This geospatial-based visualization will make it easier for users to get information about the distribution of gloss and variations in the North Coast of Subang Regency. Through this mapping, linguistic conditions in an area can be visualized geospatially.

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