DRAFT Environmental and Social Impact Assessment Report

Project Number: 50182-001
November 2018

INO: Riau Natural Gas Power Project
ESIA Vol.5_Technical Appendices Part I

Prepared by ESC for the Asian Development Bank

The Sustainable Livelihood Framework is one model for understanding and improving the poverty livelihood conditions experienced by a household or community. Through this framework it can be helpful in describing the main factors affecting the living conditions of a poor family and the form of relationships among these factors.

This concept can be used for planning development programs and assessing the extent to which effectiveness and contributions have been made in community empowerment programs. In addition to the five capitals mentioned above, poverty and vulnerability conditions are also influenced by trends or changes tendency that occurs in society such as ecological and social conditions, the occurrence of natural disasters, famine, and so forth. Furthermore, this framework also provides an overview of how the institutional and government policy aspects have also contributed greatly to the ups and downs of the livelihoods and vulnerability of households and communities.

1.2 OBJECTIVE

The objectives of this baseline social study are as follows:

- To know the social, economic, cultural and public health conditions along the 250MW GSPP Riau gas pipeline;
- To know the community perception along the 250MW GSPP Riau gas pipeline about the planned installation of the 250 MW GSPP Riau gas pipe; and
- Especially this study is also for digging about the interaction pattern between the people of the community around the locations of temporary jetty and water intake of 250MW GSPP Riau with the Siak River.

2 STUDY SCOPE

2.1 LOCATION

The baseline social study covers two study areas, namely (1) gas pipeline area; and (2) temporary jetty and water intake area.

The baseline social study location for gas pipeline areas cover five villages in three sub-districts within the Pekanbaru City and Siak District. This study location is an area that will be passed through by a 40km gas pipeline, which stretching from gas pipe tapping location in Kuala Gasib Village to the power plant location in Industri Tenayan Village. Below is the names of study location villages:

Table 2-1 Study Location Administration Area in Gas Pipeline Area

City/District	Sub-district	Village
Pekanbaru City	Tenayan Raya	1) Melebung Village
Siak District	Tualang	2) Meredan Village
		3) Tualang Timur Village
		4) Pinang Sebatang Village
	Koto Gasib	5) Kuala Gasib Villlage

Source : Prime Data, 2018

While for the study area of temporary jetty and water intake locations, was conducted on the Sik Riverbank which there will be temporary jetty facilities being built for GSPP construction project mobilization needs and GSPP water intake facilities in the Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

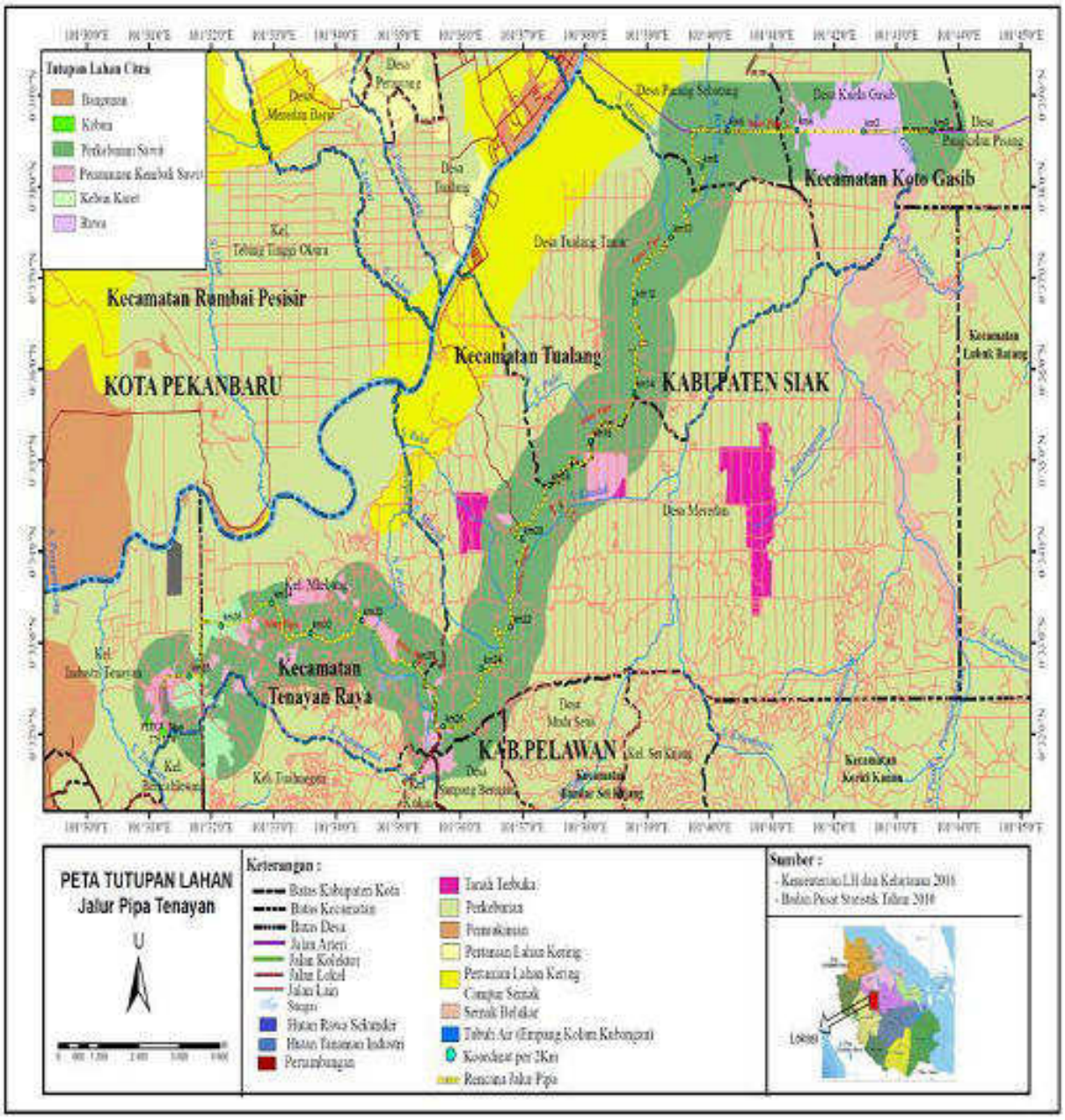

Figure 2-1 Map of Gas Pipeline and Study Locations

Figure 2-2 Satellitee Image of Temporary Jetty and Water Intake Areas

On below table it can be seen the study location area borders:

Table 2-2 The Administrative Area Borders of Study Locations

No	Area	Borders			
		North	South	East	West
1	Pekanbaru City	Siak and Kampar Districts	Kampar and Pelalawan Districts	Siak and Pelalawan Districts	Kampar District
2	Tenayan Raya Sub-district	Siak River	Kampar District	Siak and Pelalawan Districts	Sail River
3	Industri Tenayan Village	Siak River (Rumbai Pesisir Sub-district	Penampuan River (Sialang Sakti Village)	Sungai Teleju (Bambu Kuning Village)	Tujuh Puluh Street (Melebung Village)
4	Tuah Negeri Village	Penampuan River (Melebung Village)	Tenayan Stream (Lubuk Kompeh) and Budi Luhur Street (Kulim Village)	Beringin Street (Siak District)	Binjai River and Tujuh Puluh Street (Sialang Sakti and Bencah Lesung Villages)
5	Melebung Village	Siak River , Rumbai Pesisir Village	Penampuan River (Tuah Negeri Village)	Pendanau River and Beringin Street (Siak District)	Tujuh Puluh Street (Industri Tenayan Village)
6	Siak District	Bengkalis District	Kampar, Pelalawan	Bengkalis, Rokan Hulu, Kampar	Bengkalis and Pelalawn

			Districts and Pekanbaru City	Districts and Pekanbaru City	Districts
7	Tualang Sub-district	Minas Sub-district	Kerinci Kanan Sub-district	Koto Gasib, and Lubuk Dalam Sub-districts	Minas Sub-district, Pekanbaru City
8	Maredan Village	Tualang Village	Pekanbaru City	Koto Gasib Sub-distrct	Pekanbaru City
No	**Area**	**Borders**			
		North		**North**	
9	Tualang Timur Village	Pinang Sebatang Village	Maredan Village	Tualang Village	Koto Gasib Sub-district
10	Pinang Sebatang Village	Koto Gasib Sub-district	Tualang Timur Village	Koto Gasib Sub-district	Pinang Sebatang Barat
11	Koto Gasib Village	Sungai Mandau Sub-district, Siak sub-district	Lubuk Dalam Sub-district	Dayun, Mempura Sub-districts	Tualang Sub-district
12	Kuala Gasib Village	Sungai Mandau Sub-district	Tualang Sub-district	Teluk Rimba Village	Sungai Mandau Sub District

Source : Prime Data, 2018

2.2 POPULATION

The population in this study are all the households in the five villages around the gas pipeline area which will be directly impacted by gas pipe installation, which are the households within the ±20 range of the gas pipeline on either side. Should there were gas pipeline passing through the plantation area where there were no houses exist, then the population in the nearest village is assumed to be the representative of impacted household. The sample total were 150 respondents, namely 30 respondents in each village and assumed to represent the condition of all the population in the study location.

Specifically for the temporary jetty and water intake area, there was no sampling survey conducted on the population, and only qualitative study was done focusing on the interaction pattern between the community with the Siak River.

2.3 DATA NEEDS

The data needs of this baseline social study are as follows :

1. The socio-economy data along the gas pipeline with the study objects as follows :
   - Residents;
   - Businesses such as grocery stores, kiosks, shops or restaurants;
   - Squatters or cultivators;
   - Agriculture activities (farming or plantation land); and
   - Other business activities
2. The community's health data in five study llocation villages covers 10 major community diseases, health facilities, medical personels, environmental sanitationand health issues;

3. The education data in five study location covers the general condition of the education, education facilities, instructors, pupils numbers, and educational issues;
4. The borders of study location villages, and the history of community's settlement development in study location;
5. The cultural data covers the study object as follows:
   - Community's historical background and ethnicity which currently exist in study location.
   - Custom and important tradition that applied in the study location's community.;
   - A cultural heritage site located within a two kilometer radius of the gas pipeline;
6. The socio-economy and cultural data in the temporary jetty and water intake area : The The study focus was the interaction pattern between local people with the Siak River, either in the water usage as the livelihood sources, transportation means or other social functions.

2.4 IMPLEMENTATION TIME

The implementation of the study consists of three stages of activity, namely the survey and data collection stage, data processing and analysis stage, and report preparation data. Data collection activities were conducted at the study sites on 14 till 24 February 2018. Then continued with data processing and report preparation in Jakarta until April 2018.

2.5 STUDY LIMITATION

In this social baseline study execution, there were several study limits that had implication toward the field data result as follows:

- Not all villages in the study location has complete data in its monograph, especially related to the villagers numbers and composition based on ethnic gtoup or religion, age group and education level;
- There were obstacles in getting the helath data in Tenayan Raya Sub-district, caused by the following factors:
  - There were a quite strict bureaucratic process in getting the health data in Public Health Centre, whereas it has through the permission process of Kesbangpol (Unity of nation and politic) and Health Agency of Pekanbaru City;
  - There were new administrative area as a result of area's division such as Industri Tenayan Village which still do not have subsidiary public health centre; and
  - The public health official in the subsidiary public health centre in Melebung Village was hard to see.

3 METHODOLOGY

3.1 RESEARCH DESIGN

This study uses the theory of the Sustainable Livelihood Framework developed by Chambers and Conway (1992). This framework theory of sustainable livelihood resources analyzes the social and economic conditions of family and society by using five livelihood capital sources, namely human capital, natural capital, social capital, physical capital, and financial capital. These five capital sources of livelihood are then downgraded into several measurable variables in the field.

The above five capital livelihood resources owned will then be combined with several other external conditions, such as the vulnerability context caused by ecological and social conditions, existing institutional conditions in society, and government policies. The combination of capital livelihoods ownership and external conditions will influence the forms of livelihood strategies that will be developed and will ultimately determine the conditions of the welfare of a community. All these series of processes will form a framework called the Sustainable Livelihoods Resources Framework as in ***Picture 2-2*** below.

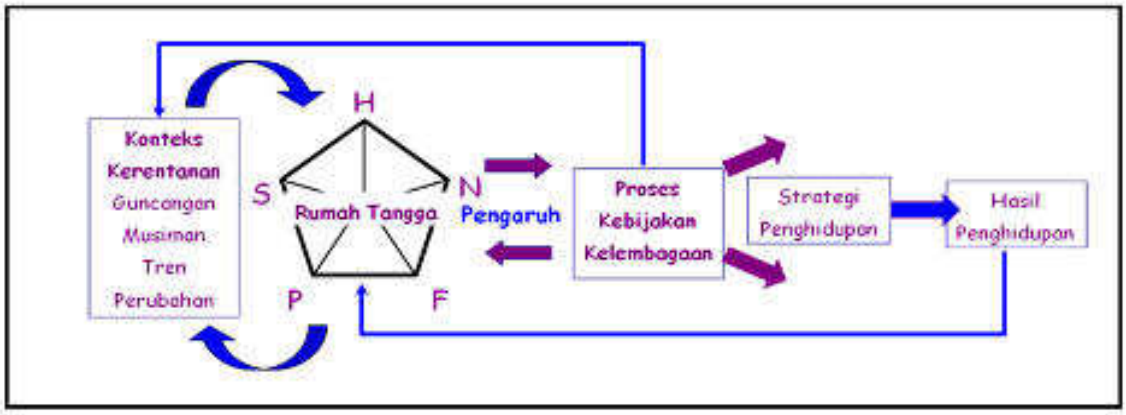

Figure 3-1 Sustainable Livelihoods Resources Framework

It is through this framework that we hope to explain holistically the achievement condition from the livelihood sources experienced by a community group, and to seek alternative solutions to improve the living conditions of the community for the better. As a benchmark is for example in the form of the fulfillment of family food needs, increasing the amount of income, increasing the quality of health and education, as well as improvements in various other welfare conditions of life.

3.2 DATA COLLECTION TECHNIQUE

Socio-economic and cultural aspects data is in the form of primary and secondary data. Primary data were collected from respondents in 5 villages that will be passed through by gas pipeline construction project through (a) household survey using guided instrument of questionnaires papers designed in the form of closed and open questions; and in-depth interviews, mainly with interviewees from both the formal and non-formal figures.

The secondary data were collected from Tenayan Raya Sub-district of Pekanbaru City, Tualang and Koto Gasib sub-districts of Siak District, Village's Monograph in every village in study location, Central Bureau of Statistics (BPS) of Pekanbaru City and Siak District, Pekanbaru City Health Office and Subsidiary Puskesma (Pustu) in every study location village.

3.3 SAMPLING TECHNIQUE

The amount of sample taken in the household survey were 30 respondents which representing each Family Head for every village within the study location. The sample numbers taken was decided based on the minimum standard of survey research, which is a minimum of 30 people per village unit[1].

This baseline social survey is using purposive sampling technique. By using this technique, the researcher deciding the samples taken themselves, considering the relevant characteristic respondents with the study needs and the scope of project area priority.

The household survey research sampling covered the group of household exists in the gas pipeline (±20 metres of the road side either left or right). However, on the gas pipeline passing through the plantation area where there were no houses, the samples were taken from the nearest village.

The sample choosing also considering the respondents representation based on the gender composititon, where as the male and female samples were quite balance (50 : 50 or close to it). Besides, the sample choosing also considered the vulnurable group representation such as poverty, elderly, disable, widow or minority groups. In this case, susceptibility is considered a condition or situation that can decrease one's or social group ability in order to fulfill their basic needs. Community's susceptibility will be different on each person or group, depends on their owned resources assets condition.

Based on the home location of the respondents, this survey is split into two respondent categories, namely the respondents who are on the gas pipeline, and the respondents who are not on the gas pipeline. The composition of the respondents can be seen in the following graph :

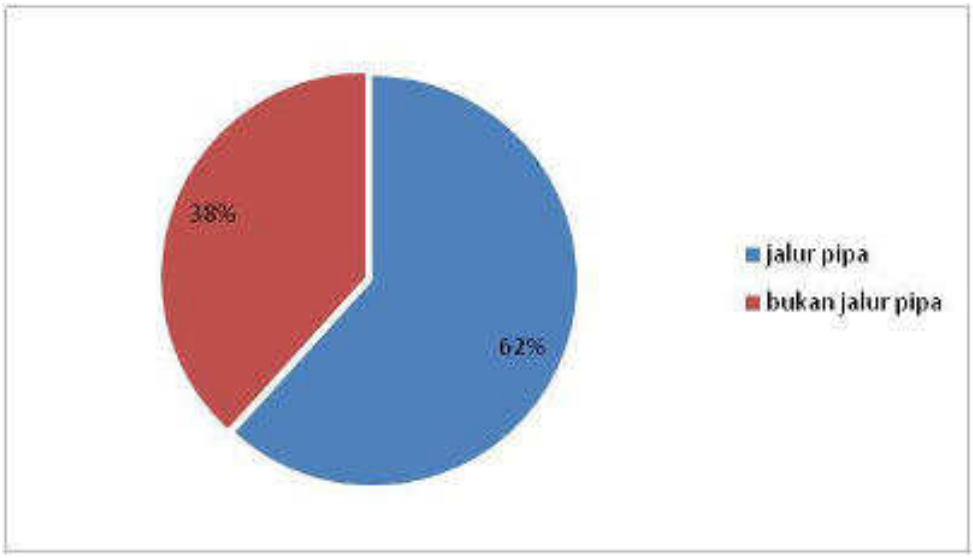

Figure 3-2 Graph of Repondent Categories Based on Home Location

[1] Singarimbun, Masriand Sofyan Effendi. 1987. Metodologi Penelitian Survei. LP3ES. Jakarta

The respondent composition based on the sex in every village of study location can be seen in below table :

Table 3-1 The Respondents Composition in Study Location Based on Sex

No	Village	Respondent Number		
		Male	Female	Total
1	Melebung	14	16	30
2	Meredan	15	15	30
3	Tualang Timur	17	13	30
4	Pinang sebatang	13	17	30
5	Kuala Gasib	17	13	30
	Total	**76**	**74**	**150**

Source : Prime Data, 2018

The survey location spreads according to the hamlet of each village can be seen in below table :

Table 3-2 Household Survey Location Spread According to Hamlet

Village	RW	Frequency	Percent
A. Melebung (Eksisting : 2 RW)	01	22	80
	02	6	20
Total		30	100
B. Meredan (Eksisting : 7 RW)	01	15	50
	02	9	30
	03	5	17
	04	1	3
Total		30	100
C. Tualang Timur (Eksisting : 7 RW)	01	17	53
	02	12	37
	05	1	10
Total		30	100
D. Pinang Sebatang (Eksisting : 5 RW)	01	1	3
	02	1	3
	03	5	17
	04	5	17
	05	18	60
Total		30	100
E. Kuala Gasib (Eksisting : 6 RW)	01	1	3
	02	14	47
	03	15	50
Total		30	100

Source : Prime Data, 2018

3.4 METHOD OF DATA ANALYSIS

3.4.1 Quantitative Data Analyis

The quantitative data analysis was done by the following steps :

- The tabulation data of 150 questioners and the result will be processed using simple statistic data processing (SPSS) to know the frequency distribution;

- The quantitavely data analysis is based on the data processing result of the questioner papers and secondary data;
- The qualitatively data analysis is based on the indepth interview with the source and information from media search.

3.4.2 Qualitative Data Analysis

The qualitative data analysis is a data arranging, structuring, and interpreting process which is irregular (data of the interviews with sources or key informants). Data analysis is not done in one step only, after the data is collected, but it is a systematic process going within a cycle during the research process. The qualitative analysis covers three steps which are data reduction, data presentation, and conclusion (Milesand Hubermans, 1992 in Dassir, 2007). Data reduction is a process to sharpening, grouping, directing, simplifying, separating unused data and organizing data. After the data and information are edited and analized, then an aquired data and information presentation is compiled as a based of conclusion.

3.4.3 METHOD OF CALCULATING HOUSEHOLD REVENUES

The household income of the respondents were determined through survey by calculating all family capital that has aggregate economic value. The types of capital calculated are:

- Capital based on natural resources. Some components of natural resources that can be accounted for in family income are the production of land owned or rented, captured fishery production or cultivation (including non-fish commodities such as shrimp, shell etc.), livestock production, mining production, forest product production (including non-timber forest products) is adjusted to the potential in the study area
- Financial capital, such as wages / salaries, and remittances from family or relatives.
- Capital that is not based on natural resources, such as trade, transportation and services.

The aggregate income of all such capital is the family income within a year. By knowing the number of family members of respondents, per capita income can be calculated. Based on the amount of family income earned from the calculation of all family-owned capital, we can determine the level of economy, whether it is below the poverty line in accordance with the World Bank or not.

On the 2015 the World Bank decide the newest poverty line for developing countries is US $2 per capita per day based on purchasing power dARIrities. That is, individuals who are considered poor in this world are people who spend less than US $2 per day or US $60 per month. Should calculated using the standard exchange rate of Rp 13.000 per dollar, then the value is Rp 780.000 per capita per month.

Meanwhile, to determine the regional poverty standard we can use the Poverty Line of Statictic Centre Buraue, which is the Poverty Line of Riau Province standard year 2017. Where as for village area is as much as Rp 457.356 per capita per month.

3.5 IDENTIFICATION OF CULTURE HERITAGE

3.5.1 The National Legal Basis on the Protection of Cultural Heritage

Refering to Law No 11 Year 2011 about Cultural Heritage, it was noted that Cultural Heritage is material object such as heritage objects, heritage structures, cultural heritage structures, cultural heritage sites, and cultural conservation areas, both land and water. Their existence must be preserved because they have important value for history, science, education, religion, and culture which needs to be preserved through deciding process. The type of cultural heritage is as explained in Chapter 1, article 1 which are:

1) Heritage Objects are natural and man-made objects, whether mobile or immovable, in the form of units or groups, or parts thereof, or the rest of which have a close relationship with the culture and history of human development;
2) Heritage Buildings are built with compositions made of natural or artificial objects to meet the needs of walled and / or no walled and roofed.;
3) The structure of cultural heritage is the arrangement of objects made of natural and / or man-made objects to meet the needs of space activities that are integrated with nature, facilities, and infrastructure to accommodate human needs;
4) Heritage Sites are locations on land and in water containing cultural objects, heritage buildings, and heritage buildings as a result of human activity or evidence of events in the past;
5) The cultural heritage area is a geographical space unit, which has two or more adjacent inheritances and exhibits typical layout characteristics.

3.5.2 International Legal Basis on Cultural Heritage

International Finance Corporation Performance Standard 8 (IFC PS 8) regarding cultural heritage admits the important of or cultural heritage for the current and future generations. The terms of 'Cultural Heritage' by IFC PS 8 is referring to:

1) The real form of cultural heritage, such as objects, objects, buildings, or groups of structures that are real, moving or immovable, have archaeological (pre-historical), paleontological, historical, cultural, artistic, and religious values;
2) Unique natural characteristics or real objects that embodies cultural values, such as sacred places, rocks, lakes, and waterfalls; and
3) Certain forms of intangible cultural cases are proposed for use for commercial purposes, such as cultural knowledge, innovation and community practices that embodies a traditional lifestyle.

These criteria become the basis of the researcher's analysis to identify heritage culture. The steps of identifying culture heritage are as follows:

1) Innitial information gathering from various sources;
2) On the spot site location;
3) In-depth interviews with traditional or elderly leaders, local officials and related institutions; and
4) The process of analysis and conclusion of identification.

3.6 IDENTIFICATION OF VULNURABLE GROUP AND FAMILY ECONOMIC LEVEL CLASSIFICATION

3.6.1 Vulnurable Group

The definition of Vulnurable Groups is not formulated explicitly in legislation, as contained in Article 5 paragraph (3) of Law No.39 of 1999 on Human Rights, which states that everyone who belongs to vulnurable groups is entitled to more treatment and protection with regard to its specificity. In the elucidation of the article, it is stated that what is meant by vulnurable groups, among others, are the elderly, children, the poor, pregnant women and the disabled. Meanwhile, according to Human Rights Reference 3 it was mentioned, that belonging to Vulnurable Groups are: a. Refugees, b. Internally Displaced Persons (IDPs); c. National Minorities, d. Migrant Workers; e. Indigenous Peoples, f. Children; and g. Women.

IFC defines vulnerable persons as those who, "by sex, ethnicity, age, physical or mental disability, suffer economic losses, or social status, may be more affected by the impact of project development than others and who may have limitations to access or receive assistance and benefits from the development of the project".

In this case, the vulnerability of society is not only seen from the economic aspect, but also from various aspects of community life such as health, education, public service quality, social stability, politics, culture, ecological disturbances, and others. Therefore, to find out the vulnerability of a community group in this study, it was conducted by identifying the five livelihoods resources owned by each respondent household, which includes human resources, natural resources, physical resources, financial resources and social resources. It is assumed that more and more limitations to the livelihood support resources of a household will cause the condition of the household to become increasingly vulnerable.

3.6.2 3.6.2 Family Economy Classification

In this social baseline study the family economic level is classified into four family groups: 1) Family under Poverty Line; 2) Poor Family; 3) Middle income family and 5) Rich Family.

This family economic classification uses the assumption that the study sites are located in rural areas where the socio-economic characteristics of the community are still dominated by rural communities relying on the main source of livelihoods from agriculture and plantation sectors.

This family economic classification uses the following standards:

1) Families under the Poverty Line are families with per capita income below the Riau Province Poverty Line standard of Rp 457,456 per capita per month;
2) Poor families are families with per capita income between the standard range of Riau Province Poverty Line (PL) with World Bank Poverty standard of the income range between Rp 457,456 - Rp 780,000 per capita per month;
3) In classifying the Middle income family, Riau Provincial GRDP per capita 2017 standard was used for agriculture, forestry and fishery field. This is because the study sites are rural areas where the majority of the population has livelihoods from the sector. o the Middle income family is a family with per capita income between the World Bank Poverty standard range with Riau Province's Gross Regional Domestic Product (GRDP) per capita for agriculture, forestry and fishery field, at Rp18.95 million per year or around Rp 1,580. 000 per month (range Rp 780,000 - Rp 1,580,000 per capita per month).
4) The Rich family is a family with per capita income above the Riau Province's Gross Regional Domestic Product (GRDP) per capita for agricultural, forestry and fisheries (> Rp 1,580,000 per capita per month).

4 GENERAL OVERVIEW OF STUDY AREA

4.1 GEOGRAPHICAL ASPECTS AND REGIONAL PROFILES

4.1.1 Pekanbaru City, Riau Province

Geographically, The Pekanbaru city is located between 0° 25-0° 45' North Latitude and 101° 14'-101° 34' East Longitude, with 5-50 metres above sea level and the surface of the northside is a plain and bunpy terrain with heights of 5-11 metres. The city of Pekanbaru is split by the river of Siak which flows from west to east and has several tributary namely, Umban Sari, Sail, Air Hitam, Sibam, Setukul, Kelutut, Pangambang, Ukai, Sago, Senapelan, Limau, and Tampan Rivers.

Before 1960, Pekanbaru was only a city with an area of 16 km2 which then increased to 62.96 km2 with 2 sub-districts of Senapelan and Limapuluh. Subsequently in 1965 increased to 6 sub-districts and in 1987 to 8 sub-districts with an area of 446.50 km2. In its development area of Pekanbaru City increased to 632,26 Km2 until now. Then in 2003 a new district and subdistrict was formed with Perda Pekanbaru City. 4 of 2003 to 12 sub-districts and 58 villages. One of the sub-districts formed in 2003 is Tenayan Raya Sub-District which is a divison of Bukit Raya Sub-istrict.

As the capital of Riau Province, Pekanbaru City is currently growing. The projection of urban development in the next five years is being directed to the development of the metropolitan city, which refers to the Pekanbaru City Longterm Development Plan Year 2005-2025 and the Regional Medium Term Development Plan Pekanbaru City 2017-2022. Whereas the area of Pekanbaru City will be spatially divided according to function and designation

Urban development will be divided into several Development Areas (WP) that are Availablepted to the characteristics and carrying capacity of the region such as land

availability, human resources, accessibility and potential of the region. The direction and division of Development Area can be viewed in the following table:

Table 4-1 Distribution of Expansion Area on Pekanbaru City

Expansion Area (WP)	Area Scope
WP-I 1. Trade and Services Activities Centre; 2. Private Office Centre 3. Provincial Office Centre; 4. City Governmental Office Area; 5. Settlement Area	• Pekanbaru City Sub-district; • Senapelan Sub-district; • Limapuluh Sub-district; • Sukajadi Sub-district; • Sail Sub-district
WP-II 1. Education Area; 2. Settlement Area; 3. Comercial Area; 4. Agricultural Area 5. Protected Area 6. Recreation Area	Rumbai Sub-district.
WP-III 1. Sport Activity Centre; 2. Protected Area ; 3. Settlement Area; 4. Tourism Activity Centre	Rumbai Pesisir Sub-districtc
WP-IV 1. Settlement Area; 2. Pusat Kegiatan Industri; 3. Warehousing Activity Centre; 4. Comercial Area; 5. City Governmental Office Area; 6. Tourist Area; 7. Agricultural Area	• Tenayan Raya Sub-district; • Bukit Raya Sub-district.
WP-V 1. High Education Activity Centre; 2. Settlement Area; 3. Office Area; 4. Comercial Area: 5. Limted Warehouse Area	• Marpoyan Damai Sub-district; • Tampan Sub-district; • Payung Sekaki Sub-district.

Source : Medium Term Development Plan of Pekanbaru City Year 2017 - 2022

4.1.1.1 Tenayan Raya Sub-district

Tenayan Raya sub-district is the widest sub district in Pekanbaru and its area is hilly. Tenayan Raya Sub-district is located at position 0o42 '- 0o60' North Latitude and 101o47 '- 101o59' East Longitude. Tenayan Raya sub-district borders the Saildi River to the West, Siak and Pelalawan districts to the East, and Siak River in the North and Kampar District in the South. The total area of Tenayan Raya District is 171.27 km2 or 27% of the total area of Pekanbaru City (632.26 km2). Distance from downtown Pekanbaru to District Tenayan Raya is about 14 to 15 km directly connected to the East Main Road of Sumatra.

Tenayan Raya Sub-district was established in 2003, initially consisting of only 4 villages. And now Tenayan Raya District consists of 13 villages where 10 of them are urban villages, in accord with Pekanbaru City Regulation No. 4 Year 2016. Here are the names of the villages in Tenayan Raya:

1) Kulim;
2) Tangkerang Timur;
3) Rejosari;
4) Mentangor;

5) Sialang Rampai;
6) Pebatuan
7) Bambu Kuning;
8) Pematang Kapau;
9) Sialang Sakti;
10) Tuah Negeri;
11) Bencah Lesung;
12) Industri Tenayan; dan
13) Melebung

As already known ,Tenayan Raya Sub-district will be developed into a center of industrial activities and office area of Pekanbaru Municipal Government. This is very reasonable, considering the area has a large land and the population is not as densely as other districts in Pekanbaru City.

Since the last five years, the development of development in Tenayan Raya Sub-district has started to be felt, with many infrastructure development such as Highways 70 and 45, housing and offices, especially in Tuah Negeri and Industri Tenayan Villages. In the Village Tuah Negeri, office area of Pekanbaru Municipal Government are being built, and Industry Tenayan Village will become the industrial center with the construction of Tenayan Industrial Area (TIA). Currently on the TIA's land area of 40 ha already stands SPP Tenayan 2x110 MWthat was built since 2013 and has started operating in January 2017.

Industri Tenayan and Melebung Villages are the study location in this sub-district. Although located in the area of Pekanbaru City, these two villages are still has rural vibes. Most of the land in both villages areas are dominated by individual oil palm plantations. In terms of regional development, Melebung Village is very far behind compared to Industri Tenayan Village. Construction of roads and other infrastructure are still very minimal, so the condition of the community is very alarming.

4.1.2 Siak Regency, Riau Province

Geographically Siak Regency is located at 1 ° 16'30 "LU-0 ° 20'49" LU and 100 ° 54'21 "BT-102 ° 10'59" BT, which consists mostly of lowland in the eastern and partly highland in the West. The morphology of the district of Siak is largely composed of plains and a small portion composed of hills located in the southwest. The land morphology covers about 60% of the Siak District. Low hill morphology lies on the north, east and extends from the northwest direction. The high hill morphology lies in the southwestern part of the Siak River Basin region.

Siak Regency with capital city of Siak Sri Indrapura is one of the districts in Riau Province resulted from the expansion of Bengkalis District on October 12, 1999. The division of Siak District along with 7 other districts in Riau Province is based on Law Number 53 Year 1999 regarding the Formation of Pelalawan District, Rokan Hulu District, Rokan Hilir District, Siak District, Karimun District, Natuna District, Kuantan Singingi District, and Batam City. Siak District consists of 14 sub-districts, 122 villages, and 8 urban village. Siak regency has an area of 8,556.09Km2 or 9.74% of the total area of Riau Province.

As a largely swampy area, Siak District has many rivers. The largest rivers are Siak River, then Mandau River, Rawa River, Gasib River, Siak Kecil River, Apit River, and Artificial River. In addition to river waters, Siak Regency also has several lakes, among others: Pulau Besar, Zamrud, Pulau Atas, Pulau Bawah, Serai, Air Hitam and Ketilau Lakes. These lakes have the potential to be made for freshwater fisheries and tourism.

The biggest potential in Siak Regency is oil palm and rubber plantation sub-sector. This can be seen in the land area data of Siak District year 2011 according to its usage in Table 4-2. The largest land use is plantation land that is equal to 224.168 Ha (26,20%), while the smallest is pond area which only around 17Ha.

Table 4-2 Land Area Based on Its Usage in Siak District Year 2011

Usage	Area (Ha)	Proportion (%)
Rice field	5.374	0.63
House Yard	20.191	2.36
Garden	32.709	3.82
Crop field	11.051	1.29
Grass land	810	0.09
Community Forest	95.740	11.19
State Forest	164.747	19.26
Plantation	224.168	26.20
Swamp	14.560	1.70
Pond	17	0.00
Dyke	651	0.08
Temporarily unused	64.019	7.48
House Buidling/ Lawn	112.295	13.13
Others	109.177	12.76
Total	**855.509**	**100**

Source: MTDP of Siak Year 2011 – 2016

In addition to plantation land, Siak District area also contains many forest areas. Forest area according to its functio, the biggest is the conversion forest of 371,511,477 Ha (43,42%), followed by limited production forest and production forest remain 215,394,375 Ha (25,17%) and 183,551,898 Ha (21,45 %).

4.1.2.1 Tualang Sub-district

Tualang sub-district is located between 0 ° 32'-0 ° 51 'North Latitude and 101 ° 28'-101 ° 52' East Longitude. Tualang Sub-district is an expansion of Siak Sub-district, which is divided into four sub-districts, Siak, Tualang, Kerinci Kanan and Dayun in 2001 based on Siak District Regulation no. 13 Year 2001. The area of Tualang Sub-district is 383.97 Km2 or about 4.02% of the total area of Siak District (8,275 Km2). Tualang Sub-district is adjacent to Minas District in the north; Kerinci Kanan sub district in the south; Minas sub-district, Pekanbaru City in the West; and Koto Gasib Sub-District, Lubuk Dalam Sub-district in the East. Tualang sub-district's center of government is located in the village of Perawang Barat approximately 49 km from the central government of Siak District and can be reached by land or river.

Tualang sub-district as in common with Siak District area consists of lowland and hills with soil structure generally consist of red yellow podsolic soil from rock and alluvial and soil organosol and gley humus in the form of swamp or wet land. Tualang District in general is on the plains area with the majority of the agricultural sector dominated by oil palm and rubber plantations and is one of the industrial centers in Siak District, located in Perawang Barat village.

Tualang Sub-district covers eight villages, here are the villages located in the administrative area of Tualang Sub-district:

1) Meredan;
2) Tualang;
3) Pinang Sebatang;
4) Meredan Barat;
5) Perawang;
6) Perawang Barat;
7) Pinang Sebatang Timur; dan
8) Tualang Timur

The study sites located in Tualang Sub-district are Meredan, Pinang Sebatang and Tualang Timur Villages. In general the conditions and characteristics of these three villages are not much different, where all three have rural area characteristic and are oil palm plantations. In Meredan Village, there are palm oil plantations owned by PT. Aneka Inti PersAvailable (AIP).

4.1.2.2 Koto Gasib Sub-district

Koto Gasib sub-district is located between 0 ° 65'-0 ° 74 'North Latitude and 101 ° 69'-101 ° 94' East Longitude. Koto Gasib Sub-district is an expansion area of Tualang Sub-district based on Siak District's Regional Regulation no. 41 of 2002 on the Formation of Koto Gasib, Lubuk Dalam, and Kandis Sub-districts. The area of Koto Gasib Sub-district is 702,7 Km2. Koto Gasib Sub-district is bordered by Sungai Mandau and Siak Sub-districts in the North; Lubuk Dalam Sub-district in the south; Tualang Sub-district in the West; and Dayun and Mempura Sub-districts in the East.

Formerly this area has a large kingdom precisely located at the mouth of the Gasib River on the edge of the Siak River named Kingdom of Gasib. In history mentioned that the Kingdom of Gasib is the embryo of the establishment of Siak Sri Indrapura kingdom. This kingdom is also a target of the expansion of the Kingdom of Aceh in the 14th - 15th century AD. This country is famous for its Commander's Gimbam valor and famous for the beauty of Gasib Princess named Princess Kaca Mayang. To recall the history so this area is named with Koto Gasib Sub-district. There are many historical relic sites or cultural heritage of Gasib Kingdom found in this region

Koto Gasib District initially consists of nine villages which are: Pangkalan Pisang, Kuala Gasib, Sengkemang, Buatan I, Buatan II, Teluk Rimba, Rantau Panjang, Empang Pandan, and Keranji Guguh. Then in the year 2009 there is an expansion of Rantau Panjang village named Sri Gemilang village, then in 2011 there was also the expansion of Keranji Guguh village named Tasik Seminai village. So now there are eleven villages located in the administrative area of Koto Gasib Sub-district.

Koto Gasib sub-district is generally located in the plains dominated by oil palm and rubber plantations. In addition, Koto Gasib sub-district has a port that conducts import export activities, precisely located in Buatan II village.

The study location located in Koto Gasib Sub-district is Kuala Gasib village, which is the zero spot of SGPP Tenayan gas pipeline. In the village of Kuala Gasib there is a tapping point gas pipeline of Perusahaan Gas Negara (PGN) which will be connected to the gas pipeline for PLTGU Tenayan. Similar to other study sites, Kuala Gasib Village has rural characteristic and is an oil palm plantation area, where most of the land is PT Astra's palm plantation.

4.2 DEMOGRAPHY ASPECT

4.2.1 Population Number and Density

The number of population and its density of each study location village can be seen in below table :

Table 4-3 Population Number and Density in Study Location

Area	Land Area (Km^2)	Population Number	Population Density
Pekanbaru City	632,26	1.064.556	1.684
Tenayan Raya Sub-District	171,27	158.519	926
• KIndustri Tenayan Village	19,01	2.195	115
• Melebung Village	36,67	834	23
Siak Regency	8.556,09	453.052	529
Tualang Sub-District	383,97	124.894	325
• Meredan Village	145,25	3.451	24
• Tualang Timur Village	9,98	5.737	575
• Pinang Sebatang Village	40,88	3.990	98
Koto Gasib Sub-District	702,7	22.059	31
• Kuala Gasib Village	85,2	2.313	27

Source : BPS of Pekanbaru City 2017, BPS of Siak District 2017, Monogrph of Industri Tenayan , Melebung, Meredan, Tualang Timur, Pinang Sebatang and Kuala Gasib Year 2017

Remarks :
Population density catagories according to BPS : i) <100 = very less ; ii) 100 - 250 = less ; iii) 250 -500 = medium ; iv) 500 – 750 = fairly dense ; v) 750 – 1.000 = dense; vi) > 1.000 = very dense

Based on the data, it can be seen that the population in Industri Tenayan Village is 1.24% of the population in Tenayan Raya Sub-district while Melebung Village is only 0.5% of Tenayan Raya Sub-district residents. Then the ratio of population in Meredan Village is 2.8%, Tualang Timur Village is 4.6% and Pinang Sebatang Village is 3.2% of the population in Tualang Sub-district. While the total population of Kuala Gasib Village is 10.5% of the population in Koto Gasib Sub-district.

When looking at the population density, the study site villages are included in the less dense criteria and even very less dense, except for Tualang Timur which is included in the fairly dense criteria.

4.2.2 Household Numbers and Average Numbers of Family Member

The household numbers and average number of family member data in study location can be seen in below table :

Table 4-4 Household Numbers and Average Numbers of Family Member in Study Location

Area	Population Number	Household Number	Ppulation and Household Number Ratio (%)	Average of Family Member Number
Pekanbaru City	1.064.566	253.533	23,82	4,20
Tenayan Raya Sub-District	158.519	36.742	23,18	4,31
• KIndustri Tenayan Village	2.195	572	26,06	3,84
• Melebung Village	834	151	18,11	5,52
Siak Regency	453.052	92.180	20,35	4,91
Tualang Sub-District	124.894	28.313	22,67	4,41

• Meredan Village	3.451	852	24,72	4,05
• Tualang Timur Village	5.737	1.637	28,53	3,50
• Pinang Sebatang Village	3.990	1.130	30,48	3,53
Koto Gasib Sub-District	22.059	5.323	24,13	4,14
• Kuala Gasib Village	2.313	584	25,25	3,96

Source : BPS Pekanbaru City 2017, BPS Siak District 2017, Monograph of Industri Tenayan , Melebung, Meredan, Tualang Timur, Pinang Sebatang and Kuala Gasib Year 2017.

The largest number of households are in Tualang Timur and Pinang Sebatang Villages, in accordance with the number of people who are also many. Then for the ratio of the number of household to the population, Pinang Sebatang Village has the highest ratio of 30.48%. This means that 30.48% of the population of Pinang Sebatang is the Family Head and the remaining 69.52% of the population is family members, with an average number of family members of 3.53 (3 - 4 persons).

While the least number of households is in Melebung Village, which has a ratio value of the number of households with the total population is 18.11%, with an average number of family members 5.52 (5-6 people).

4.2.3 Population Composition based on Sex

Population composition by sex in the study location can be seen in the following table:

Table 4-5 Population Composition by Sex in theStudy Location

Area	Male	Female	Population Number	Sex Ratio
Pekanbaru City	546.400	518.166	1.064.566	105
Tenayan Raya Sub-District	81.777	16.742	158.519	107
• KIndustri Tenayan Village	1.068	1.127	2.195	95
• Melebung Village	451	383	834	118
Siak Regency	232.553	220.499	453.052	105
Tualang Sub-District	64.536	60.358	124.894	107
• Meredan Village	1.762	1.689	3.451	105
• Tualang Timur Village	3.021	2.716	5.737	111
• Pinang Sebatang Village	2.271	1.719	3.990	132
Koto Gasib Sub-District	11.230	10.829	22.059	104
• Kuala Gasib Village	1.143	1.170	2.313	98

Source : BPS Pekanbaru City 2017, BPS Siak District 2017, Monograph of Industri Tenayan , Melebung, Meredan, Tualang Timur, Pinang Sebatang and Kuala Gasib Year 2017.

In **Table 4-5** it can be seen that generally in the area of Pekanbaru City and Siak District, they have more male population than female population, with the same sex ratio of 105. This means that in the area of Pekanbaru City and Siak District generally in every population of 100 female population there are 105 male population.

This condition is reflected in the population composition in the study site villages, except for Industri Tenayan and Kuala Gasib Villages. In both locations the female population is larger than the male population, with a sex ratio of 95 for Industri Tenayan and 98 for Kuala Gasib.

4.2.4 Population CompositionBased on Age Group

For population data based on age group, we only got data from Industri Tenayan, Meredan and Pinang Sebatang. While in the Melebung monograph, Tualang Timur and Kuala Gasib the data were not available. However, in general it can be seen from the composition of the population in Pekanbaru City and Siak District, in the following table:

Table 4-6 Population Composition Based on Age Group in Pekanbaru City and Siak District

Age Group	Pekanbaru City	Siak District
- 0 – 4	**109.012**	**40.052**
- 5 – 9	**94.233**	**55.345**
- 10 – 14	**87.316**	**54.867**
- 15 – 19	**101.860**	**44.669**
- 20 – 24	**123.587**	**41.373**
- 25 – 29	**101.873**	**46.834**
- 30 – 34	**91.377**	**50.180**
- 35 – 39	**86.621**	**44.577**
- 40 – 44	**76.456**	**38.475**
- 45 – 49	**62.326**	**28.058**
- 50 – 54	**46.609**	**17.658**
- 55 – 59	**34.521**	**11.742**
- 60 – 64	**20.597**	**7.729**
- 65+	**28.128**	**10.408**
Total	**1.064.566**	**453.052**

Source : BPS Pekanbaru City 2017and Siak District Profile Year 2016

Population composition by age group in each village of study location can be seen in the following table:

Table 4-7 Population Composition Based on Age Group in Industri Tenayan

VILLAGE	Population clasification According to Age															TOTAL
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 and up	

Source : Monograph Industri Tenayan Year 2017

Table 4-8 Population Composition Based on Age Group in Meredan and Pinang Sebatang

VILLAGE	Population clasification According to Age									TOTAL
	0 to 5	6 to 12	13 to 16	17 to 19	20 to 25	26 to 39	40 to 55	56 and up	60 and up	

Source : Monograph Meredan and Pinang Sebatang Year 2017

In the above data it can be seen that the majority of residents in the three study locations villages are in the productive age of the age of 15 to 60 years. And there are quite a lot of people who have not yet reached adulthood, which is there are 24% in Tenayan Industry, 40% in Meredan and 37% in Pinang Sebatang.

4.3 POPULATION SETTLEMENT AND INFRASTRUCTURE

4.3.1 Population Settlement Pattern

This survey activity can also identify the pattern of settlement areas in the five study villages along the gas pipeline, as follows:

- Concentrations of Kuala Gasib and Tualang TImur settlements are located along the main roads or roads owned by Regional Government; and
- The concentration of Pinang Sebatang, Maredan and Melebung settlements are on the banks of the Siak River.

While for public facilities such as Village Office, Subsidiary Public Health Centre / Village Policlinic / Village Health Post and Elementary School are generally located within or in the center of the settlement.

Figure 4-1 Satellite Images of Residential Areas of Study Sites Villages Along the Gas Pipeline

The above picture shows that the main residential areas for Pinang Sebatang, Meredan and Melebung are on the bank of the Siak River and are located far from the SGPP's gas pipeline. While the location of temporarry jetty and water intake in Industri Tenayan Village were adjacent to the location of Tenayan power plant and located far from residential areas.

Figure 4-2 Satellite Image of Kuala Gasib Village's Settlement Area

In the picture above, the residential of Kuala Gasib Village are on the edge of the Regional Government main road, while the area is more dominated by plantation or agricultural land. But more concentrated on the left side of the road, while on the right side there is no settlement. And the residential population is on the gas pipeline. Village Offices, Elementary Schools and Puskesmas Pembantu Kuala Gasib are in the vicinity of residential areas. In addition there are also worshipping facilities in the form of mosques and musholla, small shops and kiosks that blend with the home residents.

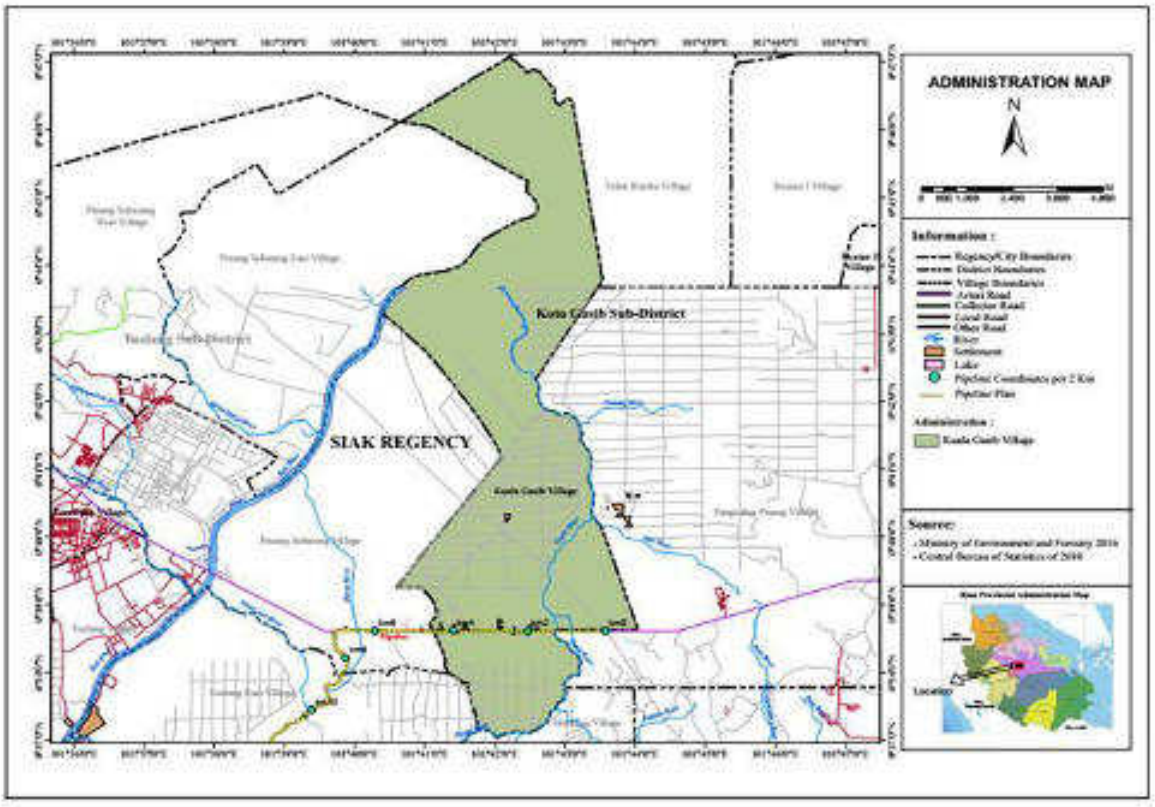

Figure 4-3 Map of Kuala Gasib Village Area

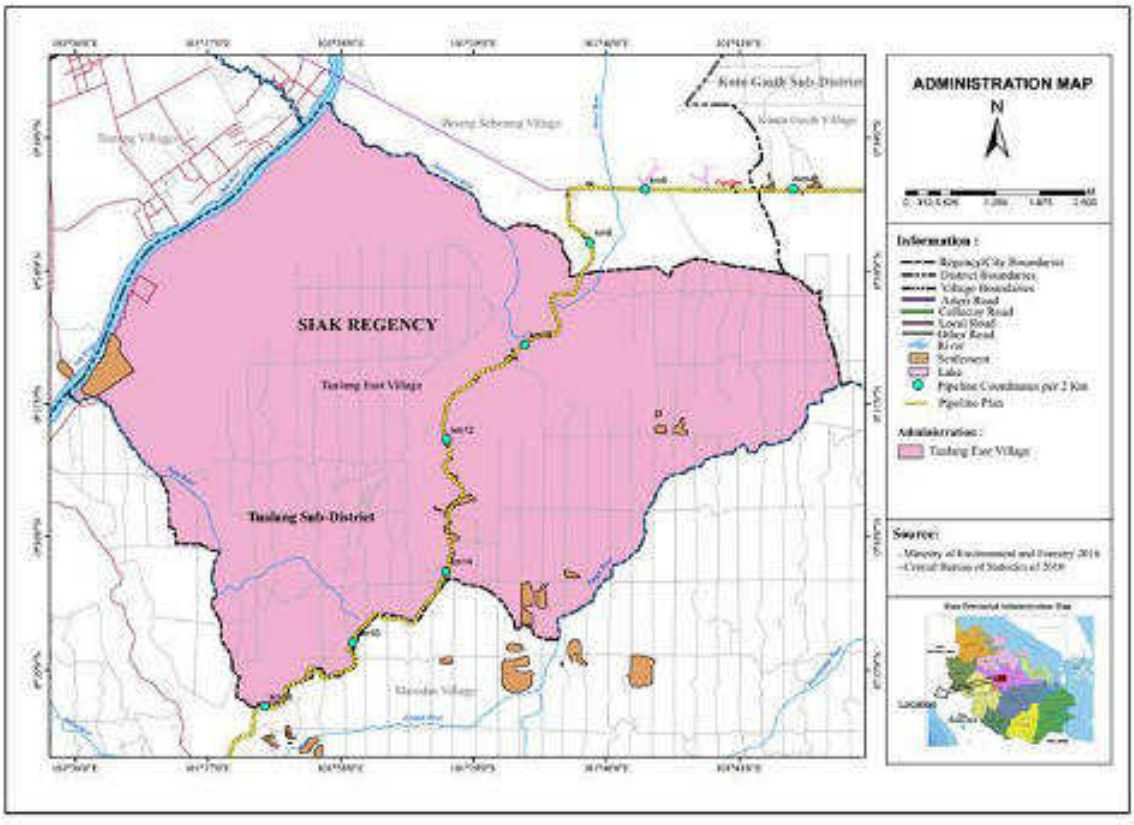

Figure 4-4 Map of Tualang Timur Vllage Area

Figure 4-5 Satellite Images of Tualang Timur Village Settlement Areas

Similar conditions exist in Tualang Timur, where residential areas are on the Regional Government's main roads. But what distinguishes it is that the area looks more crowded and the settlements are on either side of the main road. If we look at the population data, Tualang Timur has the highest population among the other study locations and has a high density of 575 people per square kilometer. And there are many settlements in the gas pipeline.

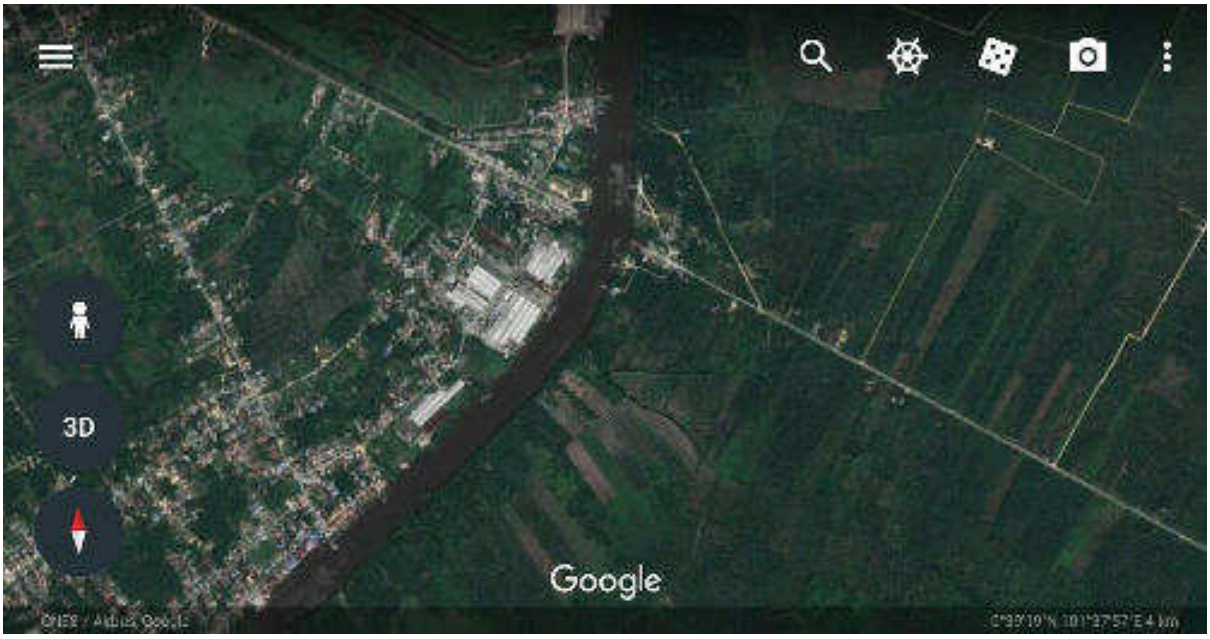

Figure 4-6 Satellite images of Pinang Sebatang Village Residential Area Across the Siak River

Figure 4-7 Satellite images of Pinang Sebatang Village Residential Area in Gasib – Pinang Sebatang T-Junction road

In **Figure 4-4** we can see satellite imagery of Pinang Sebatang residential location concentrated across the Siak River and very dense. The Village Office is located in a residential area across the Siak River and is away from the gas pipeline. While the settlement on the side of the Gasib-Pinang T-junction road is not too crowded, but there are still quite a lot of settlements in the gas pipeline.

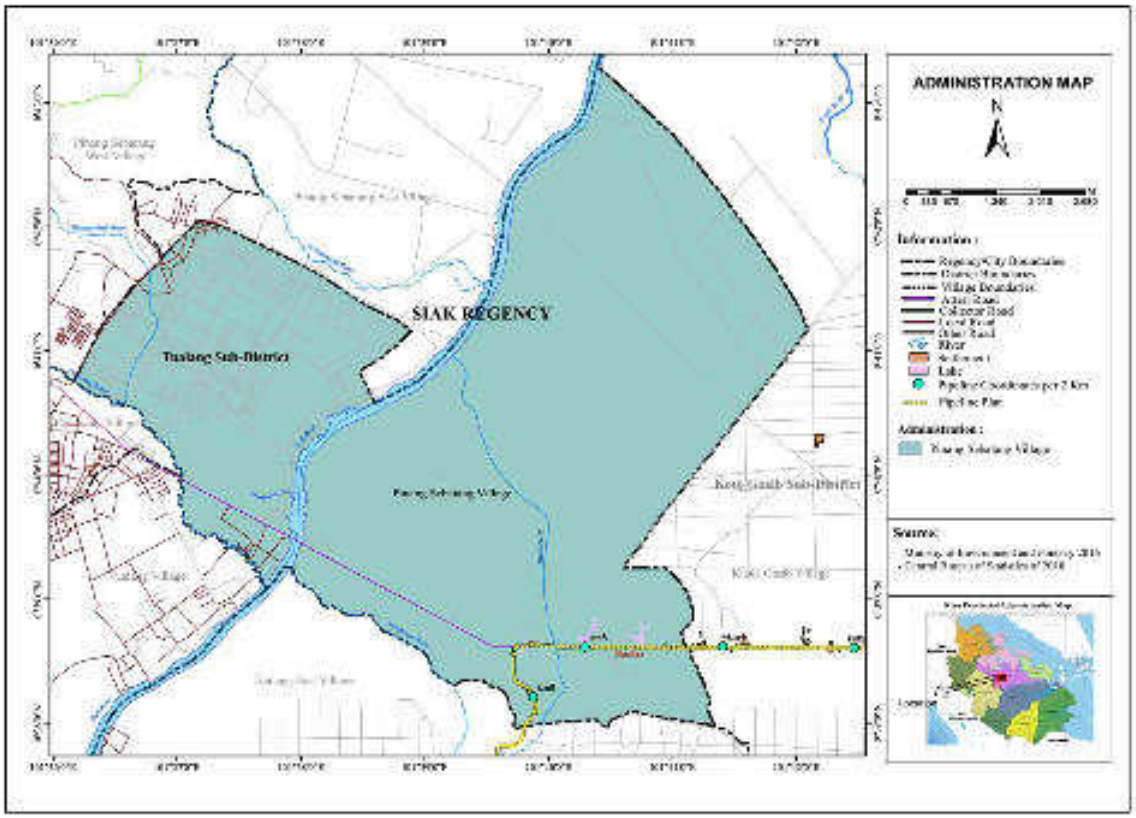

Figure 4-8 Map of Tualang Timur Villag Area

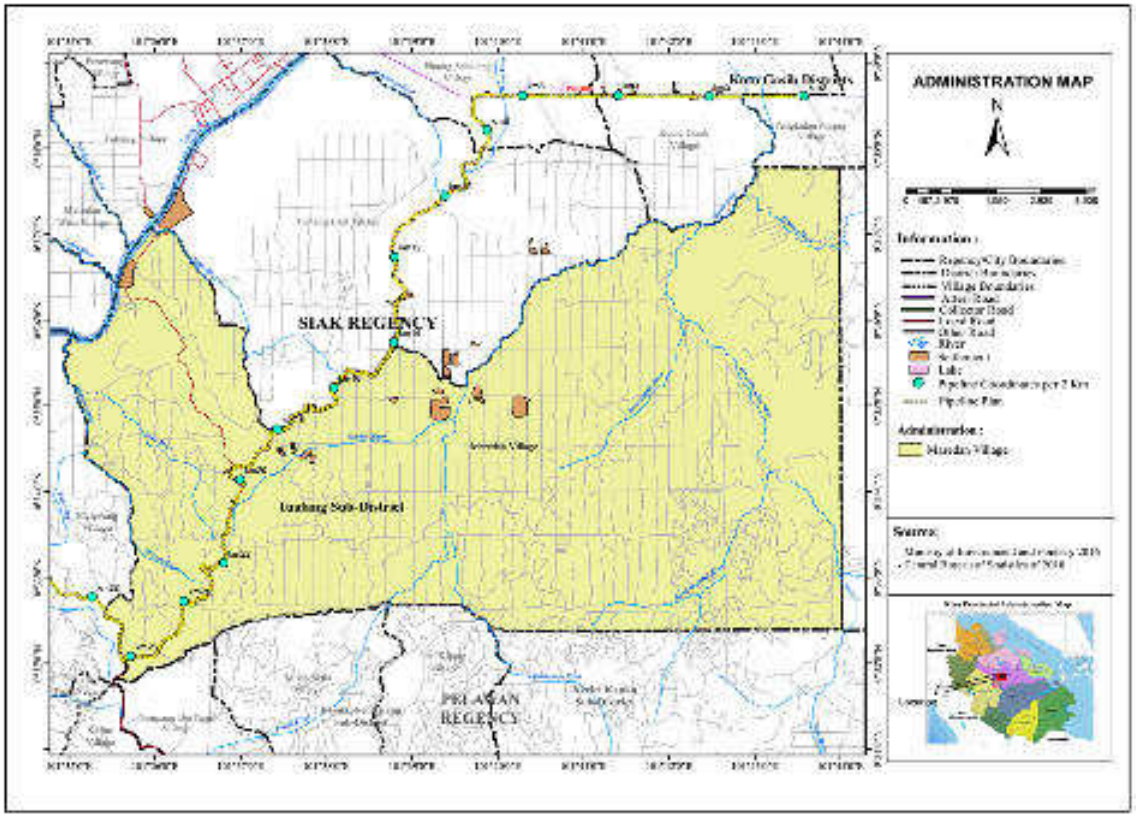

Figure 4-9 Map of Meredan Village Area

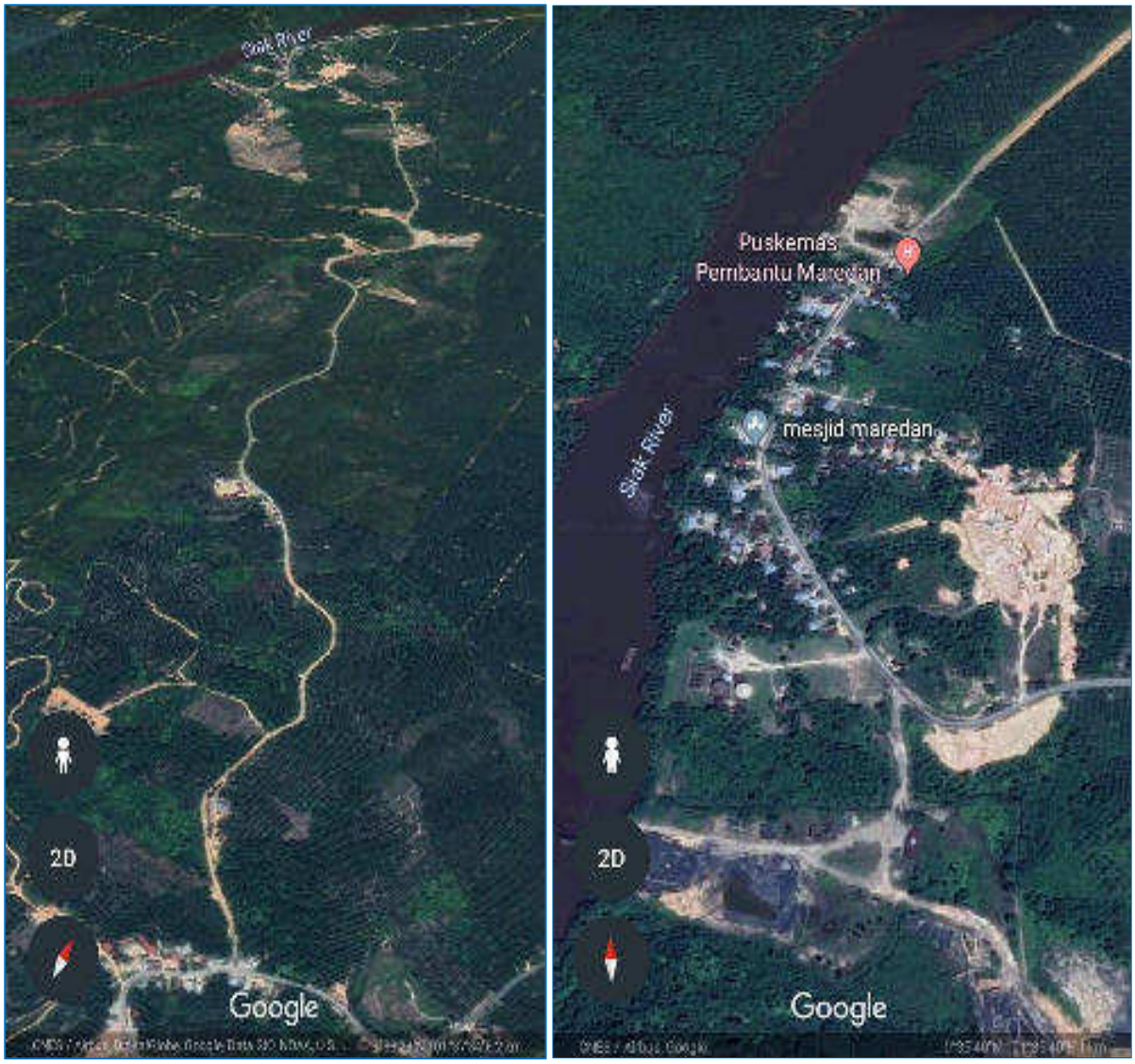

Figure 4-10 Satellite Image of Meredan Village Residential Area

In the picture above, it can be seen that the concentration of residential of Meredan Village is in the east bank of the Siak River. Likewise with public facilities such as Subsidiary Public Health Centre and mosques that are among the settlements. Similar to Pinang Sebatang Village, the settlements in the gas pipeline are not overcrowded. The gas pipelines are more passing through the area of oil palm plantations and there are buildings owned by the plantation company PT. Aneka Inti PersAvailable which is in gas pipeline.

For Melebung Village, the gas pipeline goes into the oil palm plantation area and only few residents are in the gas pipeline. Population settlements are concentrated deep within and are on the outskirts of the Siak River. In addition, the population in the Melebung Village is still small with a density of only 23 people per square kilometer. Melebung Village's residential area can be seen in the following satellite images:

Figure 4-11 Satellite images of Melebung Village Residential Area

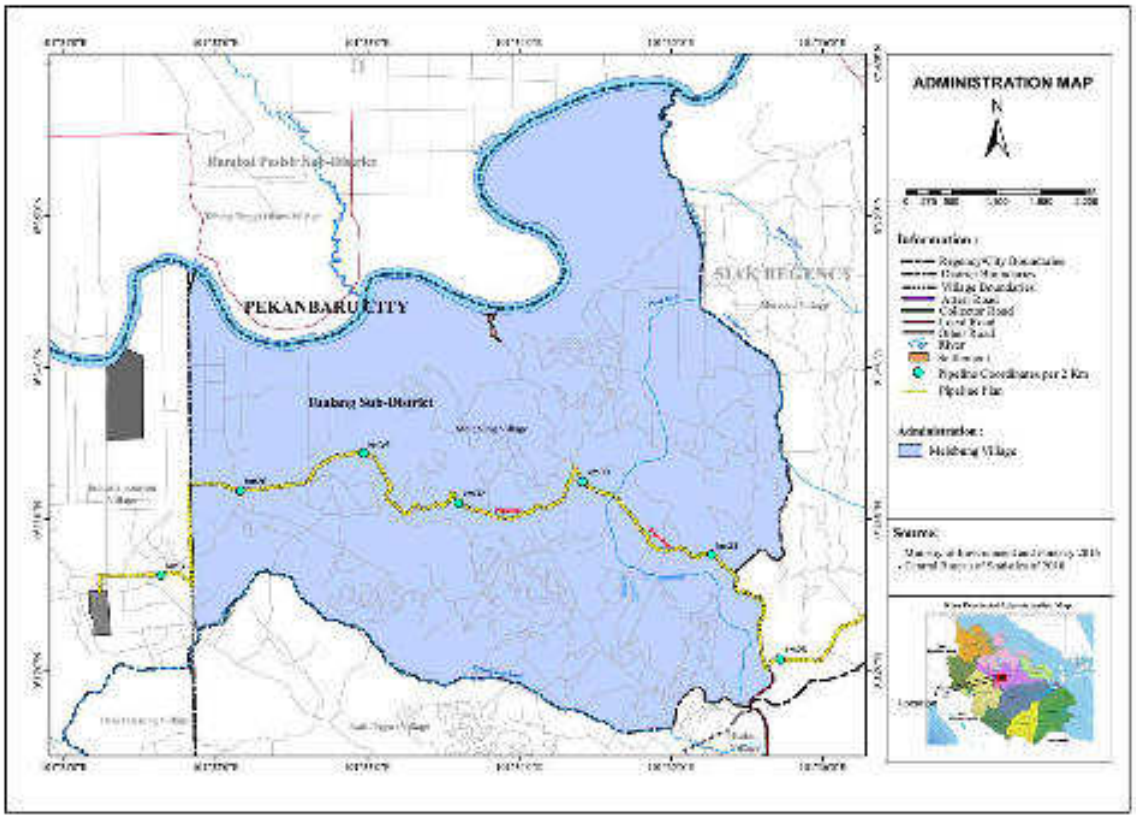

Figure 4-12 Map of Melebung Village Area

4.3.2 The History of the Village and the Origins of Local Communities

4.3.2.1 The Early History of the Village

The settlements pattern in the study site villages as described above, is inseparable from the historical development of the area in Pekanbaru City and Siak District which are heavily dependent on the existence of the Siak River.

Malay is an ethnic group of indigenous people around the Siak River. They used to depend on the Siak River to meet their daily needs. Their main activity is to find fish with various types of tools such as nets and belad. Belad is a kind of long net to trap fish placed at the side of the river at low tide, and taken during the high tide. Formerly, they were nomads, moving from one side of the river to the other. They began to settle when rubber began to become a commodity of high economic value.

Since then, the villages by the river were arise. In this study, there are some old villages that still exist today. The villages are, Tebing Tinggi Okura, Melebung, Meredan, Pinang Sebatang, and also Kuala Gasib. Thus, this native Malay bond with the land has not long established. Even in Tebing Tinggi Okura village, about 10 years ago there were still people who live right on the river bank, because often flooded finally the city authorities were building them a habitable home which is now known as Lima Puluh Village. About this Mr. Hamsyir, a community leader in Bencah Lesung Village said:

> "They are the Malay islander community, which has a tradition of fishing in the Siak River. They come here because the potential of fishery is bigger considering that in the downstream area there are many big industries. They live in wooden houses by the river, and most have no land. There are even 50 families relocated by the government to live in the mainland because the house is not feasible, now it is called Lima Puluh Village. The Malay community in Okura, similar to that in Melebung, there are also many people who do not have large land, even the kitchen is directly adjacent to Palm plantations".

They also rely on water from the Siak River for consumption, bathing and laundry. However, due to the high pollution in the Siak River now, only a small percentage of the population uses it for bathing and washing. As for consumption, almost no residents relying on water from the river that is considered the deepest in Indonesia. In addition, only a small percentage of people rely on livelihoods as fishermen, now most of them are already working in oil palm plantations.

Despite living on the banks of the Siak River with a semi nomadic lifestyle. Their contact with the industrial world has been long enough established. Since 1923, there has been oil palm plantations built by the Japanese occupation, the land is known as Okura. The company obtained permission from King of Siak, Sultan Syarief Kasim II, to do business in the field of plantation. Then, around 1960-1970, there were also operating a timber company called PT ITT. According to the search of secondary data, known by the issuance of the 1967 Forestry Law, many entrepreneurs have obtained permission to exploit forests to export timber, including in Riau. Melebung and Meredan Villages are one of the wood collection centres, because at that time in the two villages were built docks for the benefit of wood mobilization.

Due to the company's activities, both villages have road access which is still used by the community.

The same thing is experienced by the communities in Pinang Sebatang and Kuala Gasib Village. The construction of pipelines, power lines, ferry crossings, and also the Highway was built by PT Caltex since the 1970s. People are interested to live close to road access, away from the Siak River. Initially they planted paddy fields to get staple food sources with occasional fish in the Siak River or Gasib River. In that year, the people who live on the side of the highway are given land by the government. each family get the land 100 meters times 1 Km. At that time, the land did not have high economic value because the population is still very limited.

It was only in the 1980s that immigrants began to come to this region. Actually, since the development of oil palm plantations in Okura, there are already migrants from Java who work in the company. However, this year, migrants come with their own initiative. They came aiming to penetrate wood, which at that time was allowed to be taken by the government because the location will be built new palm oil plantation company. They work to cut down trees and then process them into building materials. One of the early generations of immigrants who came was Mr. Sutrisno, who now serves as head of Neigborhood in Kuala Gasib Village. He explained "I came around 1983 from Rantau Prapat (North Sumatra), we were allowed to cut trees. Then, our timber were process and sell to Prawang ". After the wood in the forest runs out, a palm oil plantation was built. Those who feel at ease then choose to settle.

The next wave was in 1997. The opening of oil palm plantation requires a lot of manpower. They try their luck to work on the plantation to become laborers. Most of the migrants came from North Sumatra, both ethnic Javanese and Batak. Now they are spread in various villages such as Kuala Gasib, Pinang Sebatang, Tualang Timur and also Meredan. Most of them now have their own land, and also start their luck in other economic fields, namely trade, given the busy road situation and the gradually increasing population.

For migrants with work ties with oil palm companies, they have their own settlements. The settlement is inside the plantation area. Their numbers are quite large, with ethnic and religious backgrounds also quite diverse. In some villages, such as Kuala Gasib, Tualang Timur, and Meredan they even have their own hamlets. in Kuala Gasib village for example, there is Terusan Koto hamlet which its inhabitants are workers of PT Astra, a palm oil plantation company in the village. as well as in Pinang Sebatang and Meredan villages, workers at PT Aneka Inti PersAvailable (AIP), formerly known as PT Salim Group, have several housing complexes of workers who are members of a hamlet. Their interaction with residents outside the plantation area is very limited, especially for those living in the Terusan Koto Hamlet, as the company builds a complete infrastructure and public service facility. Starting from schools, health services, and houses of worship. On the other hand, workers living in the PT AIP plantation complex tend to be more open, in the absence of adequate public facilities and services they must use public facilities and services built by the government. Thus, their interaction with residents outside the plantation is quite intense.

The next wave of migrants was related to the government policy that allowed companies to use outsourced labor in 2002. In order to get cheap labor without work ties, companies began to use the pattern. They work with labor suppliers to handle various jobs in the

garden, such as planting, cultivating, caring for trees, and harvesting palm fruits. The laborers of Nias Island origin is imported for that need. They are known to be tenacious in working and willing to be paid cheaply. Now some of them have settled and have their own settlement in Meredan Village.

4.3.2.2 The existence of Indigenous Batin Community

Not much information is obtained from secondary data search results about the existence of indigenous communities of Batinates. The Batinates not only exist in Riau area, but also exist in neighboring province, Jambi. Thus, there is a possibility of historical similarity between the two provinces that have Malay culture. Sunarmi et al (2012) who conducted a study on indigenous people of Petalangan, in the results of these studies in harmony with the delivery of Hamsyir previously. They are migrants from the archipelago who have more fishermen or marine culture. In the Kampar region there are about 29 batinates identified, one of which is Gasib Batin. In detail Sunarmi et al explain that the Batinates as follows:

> "This community came from Johor by boat and cleared the forest in their current settlement, they became the subjects in Kampar Kingdom. Under the rule of the Pelalawan Sultanate, they acquired the right to their forest territory (batin forest land less than one thirty), led by a cultural leader known as the batin ".

Based on the above information, of course there is a confusion when discussing between Gasib Batin with the Kingdom of Gasib. If we follow the above explanation, then there is really no connection between the two things. There is a possibility, the name of Gasib which is used as the name of the batinate is actually associated with the name of the Gasib River, not the kingdom of Gasib. This is understood because in fact the batins' names that exist around the Siak and Pekanbaru Regions are also the same as the name of the river that became their territory. In addition, the river is also a natural boundary as well as the limits of power among the batins at that time. Haji Si'in, who currently becomes Tenayan Batin says the following:

> "My datuk (grandfather) was a batin, given the task by the Siak Sultan. The first Batin was Dudang, the second Batinwas Batin Banjar, I am the third. The industrial land that was built belonged to the Batin as customary land. The boundary of customary land of Batin Tenayan, are the east bordering with Batin Gasib, the border is Pendanau River. On the west side of the Sail River,the left side is included, the right side is belong to Batin Sinapelan. North of the Siak River, the northern boundary of the Batin Pengembang. To the south, bordering with Bakal Panjang. Controlled by Batin Kerinci. The Kerinci is included in a Batinate ".

The good relationship between the Siak Sultanate and the coastal tribes is strong enough. Based on the commonly studied historical texts, it is known that the first Siak Sultan was descended from the Malay Peninsula, Johor. Of course, at that time through the voyage, the relationship between the kingdoms in the interior of Sumatra with the tribes in the coast is quite close, so they are given the right to control land around the Siak River. In addition, with the empowerment of the land to the Batin, of course the position of the kingdom that is in the

interior of the River Siak become more secure, because it is guarded by people who are loyal to the Sultan.

Based on the above explanation, the Malay tribe can be divided into two groups, namely the mainlanders, who already have the pattern of cultivation and trade that lives on the plains, and the river people, a more cultured fisherman who organized in the batinates. The second group is those who are often found around the River Siak, such as those living in Melebung, Meredan, Okura Villages, and so forth. In addition, in terms of community structure the second group is simpler and most recently touched by formal education.

According to the local custom figures, it is known that the batins have the power to extract the natural resources, especially the Sialang honey. The Sialang honey is a honey derived from large trees of various types such as Kampas tree, banyan tree, meranti tree, and so forth. It is said to be a Sialang Tree if there are more than 10 beehives in Sialang. In the past, the Batins were entitled to the honey by sharing it with the Sultan. There is a possibility at that time, honey is a superior commodity Riau and surrounding areas that have high economic value.

In the past, when the kingdom of Siak surrendered its power to the Government of Indonesia, the batins powers were no longer has formal legality. They also switched functions into the government structure, there is who is a head of a village, there is who became Head of Neighborhood or currently equivalent to the head of a hamlet. As explained earlier, Batin Gasib, who also served as the head of Pinang Sebatang village, while Batin Tenayan who was then held by Banjar, he became the head of the Neigborhood in Sail village. Thus, in fact they no longer have the authority to own forest land authorized by Siak Sultan, the majority of the forest is managed by the Central Government.

When the PT Salim Group obtained a forest management permit from the government, the company with permission from Batin Gasib at the time was cutting down Sialang trees. As explained earlier, Ali Gidang, the Village Head as well as Batin Gasib get compensation for the sialang trees and the surrounding land with a compensation cost of Rp. 25,000 for each tree. Thus, it is known that people still have the view that the batin is the ruler over the sialang trees and the land that is around it. Today, there are only two remaining sialang trees remain within the oil palm plantation area of PT AIP, precisely on the banks of the Pingai River and in Tenayan Industri precisely on the banks of the Siak River. Currently the tree is still towering, but only a few sialang bees are nesting.

There are two batins in the study area, Batin Gasib and Batin Tenayan. They get the titles from passed down from generation to generation. Interestingly, there is a difference in perceptions about how the batin title should be passed down. Haji Si'in, Batin Tenayan claims to be batin because his grandfather and father are batins. While Haji Razali, Batin Gasib explains that the passing down pattern of true batin title of Gasib is through maternal lineage, or matrilineal. Razali also said that in the future, those who inherited the batin title is not his son, but his nephew or the child of his sister.

Sabo' is a respectful call for Batin Gasib. The Siak District Government when still led by Arwin AS inaugurate the batins in the region, including Batin Gasib. The inauguration took place in 2007. Thus, the batins are back has a cultural position that is recognized by the local government. Moreover, the Siak District at that time was intensively propagate customs

and local culture in the region. Currently, even though he has no authority over customary land, the government of Meredan Barat Village, where he lives today, still often invites him in every ceremonial activity of government. In addition, he is often invited specifically in every start of the project whether done by the village government and the companies in the region. The government of Mereda Barat village tends to encourage private parties to perform a joint prayer ritual led by Batin Gasib, the goal in addition to preserving the custom also to appeal to the Almighty that the development runs smoothly.

Sabo 'himself admits that he is currently focused on reviving Malay customs in his family environment. Especially related to the celebration of the human life cycle such as birth and marriage. This is also being promoted by LAM (Lembaga Availablet Melayu/ Malay Custom Beraeu) of Siak and Pekanbaru. They were delighted to have a district government guest with a "tepung tawar/ fresh flour" which is a custom procession by throwing some rice to guests or host of parties. Furthermore, Sabo' is saying that he is currently is building a private museum by collecting various tools used by ancestors such as fishing gear, tree cutter, traditional weapons and others. "So that our children and grandchildren know their ancestral culture" said Sabo' when showing off his collection.

On the other hand, the existence of Batin Tenayan tends to be controversial. Until now, he still claims that Batin Tenayan has a customary land located in IndustriTenayan Village. Moreover, he and his group in last October 2017, make efforts to pegging the land that is believed to be the customary land. Whereas now the land has been legally owned by some other parties. According to Siswanto (42 years), in fact he and his family often make a sale and purchase of land, even his two children are currently languishing in prison for related to the forgery of land documents that are traded. In old age, many people regret the efforts made by Haji Si'in. He is also currently taking legal paths with several lawyers to prove the validity of the existence of customary land in Industri Tenayan Village.

4.3.3 Infrastructure

The following table shows the condition of infrastructure in each study location village based on observations and interviews with the speakers.

Table 4-9 Infrastructure Condition in Study Location

No	Observation Objects	Kuala Gasib	Tualang Timur	Pinang Sebatang	Meredan	Melebung
1	Road	Good condition, Asphalt main road and cement village street.	Good condition, 2.600 meters district road, 9.000 meters neighborhood street	Good condition, Asphalt and cement road	Bad condition, inter village road is asphalt and dirt	Bad condition, hard dirt road
2	Public Road Lighting	Not Available	Not Available	Not Available	Not Available	Not Available
3	Water drainage (trench)	Not Available	Not Available	Not Available	Not Available	Not Available
4	Waste Container Facility	Not Available	Not Available	Not Available	Not Available	Not Available
5	Public transportation Service (Buses, shared taxi, motorcycle taxi etc)	Inter city bus	Inter city bus	Inter city bus	Inter city bus on the main road, but no transportation available that enters the centre of settlement in Siak river bank	Not Available
6	Public transportation condition (Buses, public transportation, motorcycle taxi etc)	Good	Good	Good	Bad	Bad
7	Bus stop/ Sub terminal	Not Available	Bus Agent	Not Available	Not Available	Not Available
8	Electricity condition (frequent power outage or not)	Bad condition, power is ofeten out , recently installed in February 2018.	No Electricity	Good	No Electricity (planned installation in the near future)	No Electricity ((planned installation in the near future)
9	People who has no electricity service	There are Family with no power	No Electricity	Sekar Mayang Hamlet before there is ferry crossing from Gasib was without power.	No Electricity	No Electricity
10	Water Company	Not Available	Not Available	Not Available	Not Available	Not Available
11	Village Clean Water Facilities/Pipeline	Available, Drilled wells were build in 3 RT of Sukamaju Hamlet	Available, Drinking water pipeline program but has yet operating	Not Available	Not Available	Not Available
12	Sellular Phone Signal (name the service	Bad, mostly using Telkomsel	Bad, mostly using Telkomsel	Bad, mostly using Telkomsel	Bad, mostly using Telkomsel	Bad, mostly using Telkomsel

No	Observation Objects	Kuala Gasib	Tualang Timur	Pinang Sebatang	Meredan	Melebung
	operator)					
13	Cable phone	Not Available	Not Available	Not Available	Not Available	Not Available
14	Sport Facilities	Available, badminton and volley ball courts	Available, Volley ball court and soccer field	Available, Futsal field	Available, Volley ball court and soccer field belongs to plantation company	Not Available
15	Market	Available every Thursday in village	Available every Saturday near the village	Available, every Satrday afternoon, behind the temple beside the village office	Available every Wednesday on the new market building closer to residential area	Not Available
16	Park atau Open Green Space	Available, near village office, save and loan by Bumkampung	Available, Village Economic Business managed by Bumkampung	Available, save and loan by Bumkampung	Available, save and loan by Bumkampung	Available
17	Bank/ BPR	Not Available	Not Available	Not Available	Not Available	Not Available

Source : Prime data, 2018

From the survey results can be seen some problems related to the availability of facilities and public service infrastructure for the community in the study location, which is such as poor road conditions, no PLN electricity network, no clean water facilities, no public transportation availability and bad communication networks.

Figure 4-13 Condition of Village Road in Melebung

5 ECONOMY AND COMMUNITY'S WELLFARE

5.1 MACRO ECONOMIC OF PEKANBARU CITY AND SIAK DISTRICT

5.1.1 Economy Structure

According to Pekanbaru city statistics in 2017, the economic structure of some citizen of Pekanbaru City in the last five years (2012 - 2016) has shifted from agriculture, forestry and fishery categories to other economic categories. The economic structure of this region can be seen from the magnitude of the role of each of these categories on the formation of Pekanbaru GRDP. The largest contribution in 2016 is still generated by the construction category of 29.70%, then the major trading and retail categories; car and motorcycle repairs by 29.60% and the manufacturing industry category by 19.93%. While the other category roles are under 5%.

The role of economic structure indicator can be seen simply by grouping the business fields into primary, secondary and tertiary, as can be seen in following table:

Table 5-1Economy structure of Pekanbaru City and Siak District Year 2015 - 2016

No	Business Sector	Pekanbaru City (%)		Siak District (%)	
		2015	2016	2015	2016
A	Prime : Agriculture, Animal Farming, Forestry, and Fisheries Mining and Excavating	1,62	1,66	56,17	54,96
B	Secondary : Managing Industry, Electricity, Gas and Water, Construction	49,76	49,84	39,00	39,94
C	Tersiery : Trading, Accomodation Provider, Food and Beverages, Transportation, Information and Communication, Financial Service, Real Estate, Company Service, Governmental Administration Health Service, Other service	48,62	48,50	4,83	5,20
		100,00	**100,00**	**100,00**	**100,00**

Source: BPS Pekanbaru City and Siak District , 2017

Based on these data, the role of the secondary sector still dominates with the total achievement of contribution in 2016 amounted to 49.84%. This number has increased compared to 2015 with a percentage of 49.76%.

While for the economic structure of Siak District, it is still dominated by three main categories, namely; the Mining and Quarrying category which is the largest GRDP growth with contribution ranging from 30% - 50% in the last five years, followed by the category of Processing Industry and agriculture, forestry and fisheries category. Meanwhile, other categories still provide distribution to the economic structure of Siak District on the average of under 5%, even for the category of Electricity and Gas Procurement, Water Supply

category, Waste and Recycling Management; as well as the category of Service companies their contribution were below 0.01% of Siak District's GRDP total.

5.1.2 Economic Growth

The economy of Pekanbaru City in 2016 has accelerated compared to the growth in 2015. The growth rate of Pekanbaru GRDP in 2016 reached 5.96%. The highest growth was achieved by the category of electricity and gas procurement at 11.87%. Especially for the category of agriculture, forestry and fisheries, it reached 3.94% increased from 2015 with a growth rate of 3.05%.

All other economic categories of GRDP in 2016 recorded positive growth, except for the category of water supply, waste and recycling management; as well as the category of government administration, defense and mandatory social security that experienced negative growth.

Similarly, in Siak District, where the Siak economy has experienced a negative growth trend over the past few years, its growth from 2012-2016 is 2.07%; -2,335; -0.97%, -0.21% and 0.35%. Only in 2016 Siak Regency economy experienced an increase of economic growth rate.

By 2016, all economic categories in Siak District were growing positively except for the category of Mining and Quarrying. This is due to the decrease of oil production volume (lifting) in Siak District. The highest growth was achieved by the category of Electricity and Gas Procurement at 16.30%, followed by big and retail trade categories, car and motorcycle repairs by 5.36%, other services category by 5.13%, and agriculture, forestry and fisheries amounted to 3.27%, construction category of 3.21%. As for the other categories experienced growth rate that is still below 3%.

Table 5-2 Real GRDP Growth of Pekanbaru City and Siak District According to Business Field, 2015 - 2016

Business Field		Pekanbaru City (%)		Siak District (%)	
		2015	2016	2015	2016
A	Farming, Forestry, and Fisheries	3,05	3,05	-0,62	3,27
B	Mining and Excavation	2,34	2,34	-6,36	-4,26
C	Managing Industry	7,91	7,91	3,83	1,52
D	Electricity and Gas Supply	8,08	8,08	13,18	16,30
E	Water Supply, Management of Garbage, Waste and Recycling	2,66	2,66	-2,88	-0,27
F	Construction	6,70	6,70	6,35	3,21
G	Wholesale and Retail; Car and Motorcycle Reparation	2,22	2,22	1,81	5,36
H	Transportation and Warehousing	6,79	6,79	6,29	3,00
I	Food & Beverage, and Accomodation Provider	0,50	0,50	3,91	2,17
J	Information and Communication	7,86	7,86	5,46	2,74
K	Financial Service and Insurance	6,67	6,67	-7,92	0,47
L	Real Estate	8,51	8,51	7,13	2,05
M,N	Company Service	6,76	6,76	3,46	1,11
O	Governmental Administration, Mandatory Social Security, and Land	3,20	3,20	4,12	0,42
P	Education Service	5,82	5,82	0,74	0,68
Q	Health Service and Social Activities	10,67	10,67	9,60	0,93
R,S,T,U	Other Service	19,65	19,65	6,44	5,13
Gross Regional Domestic Product		**5,57**	**5,96**	**-0,21**	**0,35**

Source: BPS Pekanbaru Cityand Siak District , 2017

5.1.3 Regional Income per Capita

GRDP per capita or income per capita is one of the indicators used to describe the level of prosperity of society in macro. Community income per capita is an important indicator of the level of welfare of the population. The higher level of income per capita of a community indicates people's purchasing power per capita is higher, which further increases the level of people's welfare. The magnitude of GRDP per capita value depends on the size of the GRDP formed and the number of residents in a year. GRDP per capita is derived from the divide between GRDP and the mid-year population.

Based on the statistical data of Pekanbaru City year 2017, GRDP per constant fix price per capita year 2016 was Rp. 86.78 million per capita per year or Rp 7.23 million per capita per month. While for Siak District, in 2016 the GRDP per constant fix price per capita reached Rp 174.25 million per year or Rp 14.52 million per capita per month. If you look at the data then it can be assumed that the level of welfare of Siak District is higher than that of the people in Pekanbaru City.

GRDP per capita according to business fields in Pekanbaru City and Siak District can be seen in the following table:

Table 5-3 GDRP Per Capita of Pekanbaru City and Siak District According to Business Field (Million Rp), Year 2015-2016

Business Field		Pekanbaru City (%)		Siak District (%)	
		2015	2016	2015	2016
A	Farming, Forestry, and Fisheries	1,29	1,42	29,45	32,17
B	Mining and Excavation	0,02	0,02	66,31	63,60
C	Managing Industry	16,09	17,30	59,37	61,66
D	Electricity and Gas Supply	0,14	0,17	0,01	0,01
E	Water Supply, Management of Garbage, Waste and Recycling	0,01	0,01	0,01	0,01
F	Construction	23,85	25,77	7,10	7,93
G	Wholesale and Retail; Car and Motorcycle Reparation	23,62	25,69	3,12	3,45
H	Transportation and Warehousing	2,03	2,20	0,17	0,18
I	Food & Beverage, and Accomodation Provider	1,75	1,82	0,07	0,08
J	Information and Communication	1,75	1,82	0,33	0,35
K	Financial Service and Insurance	2,86	3,09	0,58	0,61
L	Real Estate	2,32	2,43	0,67	0,72
M,N	Company Service	0,01	0,02	0,01	0,10
O	Governmental Administration, Mandatory Social Security, and Land	2,65	2,66	1,33	1,37
P	Education Service	0,92	0,97	0,82	0,87
Q	Health Service and Social Activities	0,39	0,42	0,32	0,34
R,S,T,U	Other Service	0,87	0,96	0,81	0,91
Produk Domestik Regional Bruto		**80,59**	**86,78**	**170.48**	**174.25**

Source: BPS Pekanbaru City and BPS Siak District, 2017

In the above table, it can be known that the biggest per capita income in Pekanbaru City are (1) construction, wholesale and retail trade; (2) car and motorcycle repairs, and (3) processing industries business fields. While in Siak District, the type of business field that has the biggest per capita income are (1) mining and quarrying, (2) processing industry, and (3) agriculture, forestry and fishery.

5.2 COMMUNITY'S ECONOMY SUB-SECTOR

Regional economic conditions can be drawn from the main economic sub-sectors of society in the study sites. Especially the villages located in Siak District, where the categories of agriculture, forestry and fisheries are the main drivers of the local community's economy. In addition, large and retail trade categories are also driving the community economy. Based on survey results and interviews it can be seen that there are three economic sub-sectors that are cultivated by the majority of people in the study sites, namely capture fisheries, oil palm plantations and trade.

5.2.1 Capture Fisheries (River Fishermen)

As explained before, the communities started to abandon fishing as livelihood. But there are still people in the study sites who depend on their livelihood from fishing in the river that connects Pekanbaru with Siak District's government center. At least, there are four villages

that have a traditional fishing population, namely Kuala Gasib, Meredan, Melebung, and Tebing Tinggi Okura. Pinang Sebatang Village, although located on the banks of the Siak River, only very few residents who are working as fishermen. This is understood because the area is located near the industrial center of PT Indah Kiat which tends to has urban industry characteristic.

Almost certainly all the traditional fishermen are Malays. They capture fish in addition to economic needs, also driven by "tastes". As Malays who are since childhood eating Siak river's fish, the need to eat river fish is something that can not be replaced with other foods. Thus, the existence of traditional fishermen will continue to exist, as long as the Malay community still exists. Instead, some youths are no longer using sampan (small flat bottom boat) instead they begin to resort to fishing using rods in smaller rivers that are more accessible.

Fishermen usually use several types of traditional boats, such as sampan, sampan-robin, and pompong. Sampan is a small flat bottom boat that uses a paddle to move and set the direction, this means of transportation is usually only used by one person. In the past, using a sampan, people were using tidal flows to fish. Now, with the engine, the sampan was modified, that what's called sampan robin or robin. Usually, sampan and sampan-robin are used for fishing by nets. In addition, the sampan is also used for transportation from one village to another. Larger wooden boats with also larger engines are called pompong. Currently, pompong is more widely used for commercial transportation, compared to fishing. This is considering the increasingly expensive fuel costs.

Figure 5-1 Fishermen Using Sampan in Siak River

The main tools for fishing are nets and splints. The net as described earlier, is a fishing gear used with the aid of a sampan. With their intuition as fishermen, they unleashed nets in places where there were many fishes. Then, the splint, is a long net mounted on the banks of the river at a time when the river water recedes and is taken back when the river recedes the second time. Please note, that the condition of the Siak River is not like the rivers in Java. The Siak River has its own high and low tides as commonly happened in the ocean.

The period of the tidal changes every six hours, thus, in each day there are two times of high tides and two times of low tides.

Patin Juara fish/ Pangasius polyuranodon (a kind of anchovy with a larger size), patin fish (pangasius), ikan gabus/ common snakehead fish, and betutu fish/ marble goby, are the type of fish that often caught by the fishermen. It is not difficult to sell the catch of the fishermen, because they can directly sell it in Prawang or in Pasar Bawah Pekanbaru. There are only a few people who do fish processing, such as making smoked fish, or that are familiarly called by the community as a sale fish. The lack of electricity resources in the villages caused the fish preservative machine to remain a luxury. Thus, there are only two types of marketing of catch fish that can be done by the fishermen, which is selling directly to the market or neighbors and make a sale fish. For Nasir, one of the fisherman and sale fish craftsman in Meredan Village, his activities in making the sale fish is driven by a non-economic purpose, that is, he wants his neighbors who want to eat fish at times can also easily have access to it. "If there are neighbors who want to eat fish, they can get it here, because most of the others directly sell the fish to the store in Prawang" said the 65-year-old fisherman.

There is no special limitation for traditional fishermen to fish. Pekanbaru residents can look for it in Pinang Sebatang area and in other places. This is understood because some fishermen must have known each other for a long time. Even for some villages such as Melebung, Meredan, and Okura still have blood ties. According to some sources, their parents originally came from Melebung, thus, the Melebung village is the oldest village among the villages located in the study area.

The income from catching fish is not high. Every kilogram of sale fish sold at a price of Rp. 100,000. Thus, the price of raw fish is certainly cheaper than that. Fish that has a high economic value is betutu fish/ marble goby, a kind of river catfish with spots. This type of fish valued at Rp. 90,000 for one kilogram. According to Raidir, one of the betutu fish collectors who live in Tebing Tinggi Okura Village, the fish is popular with Chinese community inside and outside the country.

The lack of income from the sale of fish causes the community no longer interested in this work. Work as a fisherman is just a side profession. Except for those who are in old age like Mr. Nasir. In Meredan Village alone, there are now 18 people who identify themselves as fishermen. The data was obtained from the number of BPJS / Social Service beneficiaries from Siak District Offices. Thus, it is certain that the number of fishermen is actually smaller than that number.

Fishing is not just a livelihood, but it has become a culture for the local community. It is certainly necessary to get attention from various parties who use the Siak River, especially for large ships and fast boats. Currently, every day a lot of ships passing in the Siak River, including those passing through the village community. Related with traffic activity in Siak River, the residents remind some things, first do not spur the pace too high. Both small and large vessels when passing through the Siak River at high speed will create big waves. The impact, among others, can overthrow the existing sampan around it and also damage the splints planted on the river banks. Then, the second is not to take the bow too close to the edge, because it will very disturb people's activities especially for those who are fishing, are bathing or washing, ans also damaging the splints. Raidir, one of the young fishermen in

Tebing Tinggi Okura Village, claimed to have demanded direct compensation on a large ship damaging his splint, and he eventually received compensation of ten million rupiah. Then, Nasir, one of the senior fishermen in Meredan Village conveyed as follows "we unified fisherman, every ship that is speeding too fast, will be marked, one day we will block them. We've blocked the boat together because the ship is speeding too fast and damaging our splints. "

The fishermen are also aware that pollution in the river SIak nowdays is so high. They estimate, if the pollution in the river is reduced then the catches will be increase. Thus, currently the fish season is not determined by natural factors anymore, but more on the extent to which pollution is reduced. Pollution from wood processing waste owned by PT Indah Kiat is suspected to be the main contributor to the decreasing number of fish in Siak River. Muhtar, a community leader in Pinang Sebatang Village once conducted a protest to PT Indah Kiat in the 1980s, considering the environmental damage caused by wood industry waste is quite damaging to the quality of river water. In addition, the fertilizers and pesticides used by oil palm plantations have also contributed to contamination in the Siak River. Now, palm oil plantations also contribute to increasing sediment in the Siak River, because during rainy days the mud in the trench are brought to the Siak River. "The pollution is quite heavy, but what can you do? That is hard to prove. The important thing they respect us, with no disturbing fishing activities." said Raidir.

5.2.2 Oil Palm Plantation

Oil Palm Plantation is not really a new activity in the area that passed through by the Siak River. Since 1923, Siak Kingdom has granted premission to Japanese businessmen to open Palm oil plantations in the Melebung area at that time, now known as Tebing Tinggi Okura. However, large-scale plantation activity began only in the early 1990s. PT Salim Group, identified by the public as Liem Soe Ong, obtained permission to open plantations from the Central Government. The company now has ample land covering Tualang District, Koto Gasib, and also Lubuk Dalam. At the beginning of the plantation development, the company was widely considered to be taking up community land, thus leading to strong protests from the public. Since the reformation, the company was purchased by a Malaysian company, Minamas, with the official name of PT Aneka Inti PersAvailable.

Beside PT Salim Group, in this region there is also PT Astra Argo Lestari commonly called by the community with PT Astra. The development of thisoil palm plantation is done almost simultaneously with the construction of PT Salim Group. The difference is that PT Astra has a mechanism of cooperation with the community with a plasma pattern, or known as MPC pattern (Members Primary Cooperation). PT Astra gives some of its gardens to the community, but its management is done entirely by the company. Giving is not free, people who own the garden must pay the purchase of the land in installments from the harvest of the garden. After approximately 20 years, by 2013 people already have the garden in full. The yield of the garden is given to the community through bank transfer.

The MPC system, is a response from the company after the movement from the community to resist land tenure. In the early 1990s, when the gardens began to be built, a large number of community members conducted protests, including indigenous groups. However, because the company is supported by central and local government, the community can not do much. According to Pak Muhtar, who at that time served as one of the leaders of the community,

Gasib customary leaders who also became the head of the village that is Mr. Ali Gidang was getting compensation. Each felled Sialang tree is replaced by a sum of Rp. 25,000, which was of considerable value at that time. Thus, indigenous groups no longer have the right to customary land because they have been compensated. The discussion on customary lands and groups will be discussed further in the next section.

There are three types of workers absorbed in oil palm plantations. First, they are those who have formal working relationship, whether in the field of oil palm plantation or in the processing industry. Please note that within the area of PT AIP and also Astra, there are palm oil processing factories. In fact, PT AIP has a palm oil research center which is one of the largest in Indonesia. Workers in this type of company live within the plantation area. Most of them occupy the official house that has been provided by the company. In some villages such as Kuala Gasib, Tualang Timur, and Meredan, they have a hamlet-level organizational structure separate from that of the mother hamlet.

Secondly, is the manual laborers who work through the employment agencies. Most of the workers are from Nias Island, they are hard-working and willing to be paid cheaply. They work according to need, whereas they are seasonal workers who are not local villagers. There are also some of these workers who choose to stay. In Meredan Village, they have a residential complex headed by a Neighborhood Head from among themselves. With a similar pattern, private plantations also apply the same system. The difference is that they are not legal entities. There is one plantation leader who has the authority to recruit workers without any formal contract. Thus, their work relation is only informal. Working relationships like this are widely found in Melebung and Industri Tenayan Village.

In the area of Tony Candra's plantation located in Melebung urban village, there is a settlement special for workers. The residential complex is inhabited by nearly 30 family heads , located right in the middle of the garden. He is N (50 years old), a Javanese male from North Sumatra who leads them with a plantation assistant position. Mr. N is directly responsible to Tony Candra, whose job is to manage plantation operations starting from maintenance, harvesting, goods mobilization, maintenance of production equipment, as well as employee salaries. N is highly respected by the workers as well as all members of his family. He is also handle the residency administration issues with the local Neighborhood and Hamlet Heads. Currently there are still very few workers in the place who are the residents of Melebung village, most of whom still have ID card of their origin region, which is North Sumatara.

> Thirdly, the workers are from local community elements, they are gathered in professional organizations, SPTI (Indonesian Transport Workers Union). Their job description is related to loading and unloading goods that are coming in and out of the plantation area. The SPTI chairman in Tualang Timur is mr. Arnold Siregar, regarding the problem of the work that they handle is explained as follows:
>
> > "We on the transportation unit, are about loading and unloading. It's been 10 years, compiled in SPTI. When the goods were incoming, there were more and more people. Because there is a lot of unemployment then we make this SPTI. There is already a contract with AIP, the contract is for 5 years. Initially the caretaker was an

outsider, after there was the autonomy right, we took over. In this 10 years time running under my stewardship. Now there are 30 members from this village, for loading and unloading if there are goods coming in and out. The work is depend on the season. When in the season the work is behind, we could be putting stay-over. Only during the harvest season there are lots of activities. (Salary is) following the Regional Minimum Wage

we open the book then negotiate, so there is no more bickering, the priniciple is there is a room for bargaining. In the peak season a day can resulting up to 300 thousand, from morning until afternoon. The sack counts are based on tonnage. "

Figure 5-2 Palm Oil Labor Settlement Condition in Melebung Village

In every village close to the plantation there is a SPTI management, as well as in Kuala Gasib, Meredan, and Melebung. With the SPTI is easier for companies to get seasonal labor. From the community side, of course with the increasing unemployment rate working seasonally is very helpful to get cash, especially from the youth. In addition, with the cooperation between SPTI and also the company has helped maintain good relations between companies with communities around the plantation.

In addition, there is also a social organization that tries to seek fortunes from oil palm plantation companies. It is the IPK (Ikatan Pemuda Karya), LMB (Laskar Melayu Bersatu), and Laskar Hulu Balang Melayu, and Pemuda Pancasila (PP), where these social organizations offer more to work in the security sector. The public tends to see these organizations negatively, as "thug organizations". Specifically in the study area, IPK is a fairly striking organization. According to Arnold Siregar, they get jobs to safeguard the heavy equipment owned by the plantation company. In the previous study report it was reported that LMB had argued with people in Meredan Barat, because they requested work on the PLN project in that village. On the other hand, Laskar Hulu Balang Melayu, in Tualang Sub-district is more persuasive, they not only choose the field of security work, but also the construction of small-scale buildings such as the construction of ditches around the Tenayan power plant project. Their orientation is more on channeling unemployed youth to earn income. However, in general, according to community leaders Hamsyir in Bencah Lesung

Village, they are known not to work, just want to get money in every job that exists in the area where they set up office secretariat organization.

5.2.3 Trading

The next economic source is trading, especially food traders. Since the Meredan bridge has been completed, the traffic in Tualang Timur, Pinang Sebatang, and Kuala Gasib Villages become more crowded. Currently, especially along the Bakal Main Street, there are many restaurants that provide consumptionc needs as well as rest areas for truck drivers and other road users. Minangese restaurant, grocery store, BPK (Karo Roasted Pork), Ayam Penyet, and many more lined up offering local specialties that tempt the taste. In addition, they also provide a large parking lot as well as rest areas and toilets for the exhausted truck drivers.

In addition to food, now also a lot of people who are begun opening another fortune by peddling other products such as, agricultural equipment, fuel oil, handicrafts from raw materials of oil palm leaves' bones, and so forth. Then, at certain moments, residents also take advantage of the highway to peddle fruit crops harvests like guava, durian, cimpedak, and also mangosteen. Especially for retail sellers of fuel oil, there are quite a lot, especially along the Sumatran highway. This is understood because the filling stations are still very rare in the region. In addition, there seems to be an agreement between retail outlets and retailers, which at the time of fuel entry, almost all channeled to retail traders who buy with large jerry cans, so this causes SPBU always run out of stock and there is no option for road users to buy to retailers at a significant price difference for each liter. Thus, the crowded Bakal Main Street and Sumatran Highway, now also utilized by the public for the business of retail materials.

Figure 5-3 Weekly Market Environment in Tualang Timur Village

In an effort to fulfill daily needs, the community is very dependent on the market. All villages have an open market once a week, Kuala Gasib's and Pangkalan Pisang's market day is Saturday, while Tualang Timur is on Tuesday. Only the market in Kuala Gasib already has fixed sellers, with shophouses open every day. The market location is an open field, when the market day arrived the traders who mostly residents from outside the village open a shanty in that place. Market traders are mostly mobile traders. They mostly drive pickup trucks loaded with merchandise. Vegetables, clothing, household items, toys, fruits and a variety of products are sold with simple fittings. In addition to market day, fulfillment of daily needs, especially vegetables and side dishes peddled by sellers who do round around the village by using a motorcycle.

6 SOCIAL

6.1 ETHNICITY AND RELIGION

6.1.1 Ethnic Diversity

As explained earlier that since the opening of oil palm plantations in Pekanbaru and Siak has resulted in many immigrants from various regions who later settled in the villages of study sites. From here begins the emergence of new villages around the area of oil palm plantations whose population consists of various ethnic groups.

Although suspected that in the study villages consist of various ethnic backgrounds, not all villages have population data based on ethnic backgrounds on their monographic data, as well as on population data in the study areas issued by the BPS offices. There are only two study location villages showing the composition of the population based on ethnic origin on their monographic data, namely Industri Tenayan Village where the temporary jetty and water intake area are located, and one study location village in the pipeline, Pinang Sebatang Village.

Table 6-1. Population Composition Based on Ethnicity in Industri Tenayan and Pinang Sebatang Village

VILLAGE/DESA	SUKU BANGSA						
Industri Tenayan	**Melayu**	**Jawa**	**Minang**	**Batak**	**Banjar**	**Sunda**	**JUMLAH**
	594	641	320	534	64	42	2.195
Pinang Sebatang	**Melayu**	**Jawa**	**Minang**	**Batak**	**Aceh**	**Sunda**	
	1.828	484	622	1.041	12	3	3.990
Kuala Gasib	**Melayu**	**Jawa**	**Minang**	**Batak**	**Nias**		
	739	725	33	467	14		1.978

Source : Monograph Industri Tenayan, Pinang Sebatangand Kuala Gasib, 2017

In the table above, it can be seen that there are four major ethnic groups in Industri Tenayan and Pinang Sebatang Villages, namely Malay, Javanese, Minang people, and Batak people. As for other ethnicities it was very little. Based on the results of interviews with several sources, it was also obtained the same information, that in general the majority of communities in the villages of study sites consist of those four ethnic groups.

To find out the composition of the population in the study location of gas pipeline based on ethnic group origin, it can also be determined from the result of household survey. Based on the result of household survey in the study location, it is known that there are four main ethnic groups namely Malay, Javanese, Batak people, and Minang people who live in almost every village of study location. There is exceptions to Meredan Village, where there are no respondents from Minang people ethnic. Based on the survey results, it can also be seen that the Javanese ethnic group is more dominant in Meredan, Pinang Sebatang and Kuala Gasib. While in Melebung, the majority of respondents are Malays ethnic and in Tualang Timur the majority of respondents are Batak people ethnic.

Malay ethnic groups are mostly found in villages located on the banks of the Siak River and they have livelihoods as farmers or river fishermen, such as those in Melebung. While people in the village that is far from the river is generally more dominant from Javanese or Batak people ethnics, where the source of livelihood mainly as daily labors, farmers, garden workers or traders. The Minang epople ethnic usually have a livelihood as a trader, an entrepreneur or a farmer. In the respondent data above there are also Nias people ethnic in Melebung and Meredan, and a small part of Ambonese ethnic in Melebung. These two ethnic groups are generally laborers in oil palm plantations.

Meanwhile, the indigenous Malay people do not question about the various ethnicity community that being created. They have even realized that in terms of numbers they have become a minority. The large number of immigrants dedicated to the advancement of villages, through education and health services, has helped them realize the importance of migrants in their villages. In addition, specifically in the Siak District area, with the direct election of village heads or penghulu by the community, making the presence of these immigrants is becoming increasingly needed by the elite of Malays ethnic for the sake of their electoral politics.

When viewed from their livelihood, Javanese, Batak people and Nias people are mostly in the informal sector as mentioned above. As for the formal sector, such as civil servants or private employees, generally more cultivated by residents who come from ethnic Malays, Minang and there is also from the Javanese ethnic.

According to household survey results can also be seen that there is no ethnic conflict in the study location. Though against different ethnic backgrounds, they generally declare as indigenous peoples. This is because they have lived together for decades and together built the village from the beginning.

6.1.2 Religion Diversity

The majority of the people in the study sites are moslems, but with the ethnic diversity in the community it has also led to the diversity of religion held by the community. Here is the composition of the population data in the study location based on the religion embraced. As for the monograph data of Melebung Village and Tualang Timur Village there is no such data.

Table 6-1 Population Composition Based on Religion in Industri Tenayan, Meredan, Pinang Sebatang and Kuala Gasib

VILLAGE	POPULATION NUMBER ACCORDING TO RELIGION	TOTAL

	ISLAM	CATHOLIC	PROTESTANT	HINDU	BUDHA	KONGHOCHU	
Industri Tenayan	594	641	320	534	64	42	2.195
Meredan	2.246	55	1.125				3.426
Pinang Sebatang	2.740	455	769		26		3.990
Kuala Gasib	1.999	10	304				2.313

Source : Monograph Industri Tenayan, Meredan, Pinang Sebatangand Kuala Gasib, 2017

In general there are three main religions in the study sites, namely Islam, Protestant and Catholic Christian, where Islam is the dominant religion that is embraced by the citizens. Religious life in the study sites is also quite harmonious, where there is no conflict among people of different religions. Now, the settlers who are Christians began to build their own house of worship. Basically, the village government does not prohibit, but they must meet the procedures in accordance with existing regulations. It's just that in Kuala Gasib Village, because it is designated as a Malay customary village, the village government and public figures openly expressed their objection if a house of worship other than for Muslims is established. In addition to the ease in worship, citizens who are Christians are also do not have difficulties to obtain access to the cemetery. The community independently has a public cemetery for Christians. Even in Pinang Sebatang there are Protestant Churches and Temple/ Pagoda.

Figure 6-1 Christians Worshipping Activity in Pinang Sebatang Village Church

Figure 6-2 Huat Chu Kong Temple in Pinang Sebatang Village

6.2 COMMUNITY INSTITUTION AND ORGANIZATION

The formal community institutions that are commonly found in the structure of village government organizations are Community Empowerment Institutions (LPM), Family Welfare Program Groups (PKK), Integrated Service Post (Posyandu), Karang Taruna (Youth Organization) and Village Owned Enterprises (Bumdes or Bumkampung). However, not all institutions are active in each village of study location.

According to sources in each study location village, Posyandu activities are always active and routinely held every week, especially at toddlers Posyandu. Generally Posyandu is available in every Hamlet (RW) of each study location village. Then Bumkampung is also quite active for savings and loan activities or Family Economic Business (UEK), especially in four study location villages, namely Kuala Gasib, Tualang Timur, Pinang Sebatang and Meredan.

Based on the monographic data of Industri Tenayan and Pinang Sebatang, it can be seen that Karang Taruna and PKK in both villages are actively doing activities. In addition, there is also a formal institution of Malay customs, namely the Malay Customary Institution (LAM) located at the District level, which is known to be quite active is LAM Tenayan Raya District.

In addition to formal community institutions, there are also informal community institutions that are active in routine activities, such as study groups and arisan groups, neighborhood associations (RT), or Hamlet (RW). There are also other informal community-based institutions such as Farmer Group.

While the existing community organizations in the study location villages are Transport Workers Union of Indonesia (SPTI), Youth Workers Union (IPK), Laskar Melayu Bersatu (LMB), Laskar Hulu Balang Melayu and Pemuda Pancasila (PP). As is well known, that these mass organizations generally conduct activities for loading and unloading and security services.

6.3 GENDER RELATION

The majority of citizens in the area studied are informal workers where there is no difference in the strict division of labor in the household economy. In the communy life, both men and women are equally responsible for making a living. In the palm oil farmers and fishermen, they generally live with this pattern. Men and women helping each other in the work, for example Natsir, a fishermen in Meredan Village always assisted by his wife to prepare equipment for fishing. After the fish was obtained, the Natsir's wife cleaned the fish and processed it to be used as smoked fish, or sale fish. Similarly, Legimin, a resident of Kuala Gasib who works as a palm oil farmer as well as traders of poultry meat (chicken). He and his wife work hand in hand. During market days, Legimin's wife helps the husband to prepare the chicken pieces.

Furthermore from the results of household surveys, it is revealed that the wife's role in working to help the family's source of income is relatively high, ie by 33% of respondents or about 49 respondents from a total of 150 respondents. This shows that the role of wife or women is quite large in supporting the household economy. Generally the type of work for wife is trading and generally they sell in stalls or kiosks at home. The composition of the role of husband and wife in the household more clearly can be seen in the following table:

Table 6-2 Working Husband and Wife Roles Composition

Working Husband	Working Wive	Remark
90% Morning-Noon	33% Morning-Noon	10% of not working husbands are husbands who can not work or no husband and worker husband have not left for work. 67% of not working wives are housewives or wives in sick condition.
84% Morning-Afternoon	31% Morning-Afternoon	16% of not working husbands are husbands who are unable to work or no husband and worker husband are already at home or husbands workers who have not yet left for work. 69% of not working wives are housewives or wives in sick conditions and already homes after work wives
23% Night shift	16% Night shift	77% of not working husbands are husbands who are unable to work or have no husbands and worker husbands already at home. 84% of not working wives are housewives or wives in sick conditions and wives who have finished work

Source : Prime data, 2018

Of the 33% of female respondents working, there are 6 persons as head of household or widows. Here is the composition of male and female respondents by status in the household

Table 6-3 Male and Female Respondents Status in a Household

Family Head Respondent		Family Member Respondent		Total Respondents	
Male	Female	Male	Female	Male	Female
70	6	6	68	76	74

Source : Prime data, 2018

There are 92% of male respondents as head of household and 8% of female respondents as head of household. In contrast, there are 8% of male respondents and 92% of female respondents. Some 8% of respondents of female households head generally work as farmers or trade.

For husbands who were working in oil palm plantations, both at PT Astra and PT AIP, their wives are generally housewives. Wives who become housewives are usually active in religious activities such as Religious pray chanting conducted every week. Usually the pray is done in rotation, from one house to another house.

Religious Pray Chanting (Wirid) association is a Quran recitation conducted jointly by a group of mothers. They read Yasin's chapter every week led by one of the chiefs. Usually, at one time in each month also invited a lecturer to increase the religious insight of members. Wirid is implemented from the Neighborhood Association level to the provinces in every level which was well-organized. Thus, almost all areas in Riau Province have this activity.

Often, the wirid associations also raise funds in the form of arisan. The arisan form are varies, usually adjusting the economic level of its members. There are the amount of money is equated, there are also arisan formed tiered, following the economic level of its members. The bigger the amount of money raised in an arisan group will be fewer members who can join. With the arisan, of course, it can be one alternative for household financial management for mothers. In addition, with the arisan it can also increase the mother's solidarity. This is understood because with the presence of wirid associations they have the event to meet regularly.

In some Malay ethnic people in the study area there are those who have a lineage taken from the mother. It is the Kampar District which still upholds the tradition of ninik mamak, as it is commonly developed in West Sumatra. Also happened in Pekanbaru City and Siak District. Pak Hamsyir and Sa'bo or Batin Gasib explained that the pattern of offspring used by them is matrilineal. However, the one who has authority in custom is male. While a brother of the mother's side will have the customary responsibility for his nephews, especially in the implementation of marriage customs. Although this custom has already begun to fade, but senior figures who are members of LAM are very concerned to restore the customary system, especially in practice during the wedding.

6.4 SOCIAL ISSUE

6.4.1 Social Conflict

Associated with social movement symptom conducted by society in study area it was known that there are two issues that become the central theme, that is land and environment problem. In relation to land issues, there are several social movements conducted by the community to penetrate the forest land, especially from the Malay community. Some village elders are still fresh in their minds that one of the main momentum was in the 1970s. They are now incorporated in the LAM (Lembaga Availablet Melayu), the first movement was related to forest encroachment allowed by the central government. In the early days of the New Order government, social movements of course at that time were difficult to get a place because of the authoritarian government attitude. Still in the New Order era, the second movement emerged when the entry of PT Salim Group (now PT AIP) and PT Astra. Still

related to land issues, some elements of Malay customary community assisted by non-governmental organizations have demanded land for the community. This social movement succeeded in pushing PT Astra to implement KPA system, or plasma core. Finally, in 2013, a group of people are demanding that the Siak District Government impose a second KPA, as many indigenous people still do not get a chance from PT Astra. This social movement did not get a positive response, Siak District Government and PT Astra also did not accept this demand. Some of the village apparatus questioned assumed that every social movement exists that it is driven from the outside, not the pure public interest.

Environmental-related social movements are mainly related to environmental pollution issues. From the information gathered, one of the early movements took place in the 1980s, when the community demanded PT Indah Kiat which they thought was so real in dumping industrial waste the Siak River. According Muhtar, a community leader in Pinang Sebatang, at that time their social movements are also assisted by figures from Jakarta. Currently, a group of people in Tualang Timur Village is still making a claim due to pollution by oil palm plantation companies. But now the village administration does not respond seriously. Bahari Jauhari, the new village head of Tualang Timur village for two months said:

> "The one who are making the ruckus are those who are not affected by polution, so we have difficulty carrying it. Residents who are in fact polluted did not want to file a report. There is already a team that came down to make sure, but not from PT AIP that dumping the waste, but another company. We are afraid also if later suspected to contaminate PT AIP ".

Besides related to the issue of environmental pollution, in Siak District in particular emerged a new social movement related to environmental issues. He is Suryono, a resident of Pinang Sebatang Barat who pioneered the greening through fruit crops. Suryono mobilized the farmer group organization into a strategic social movement in the Tualang region after an intense conflict with PT Arara Abadi related to land issues. Now they are at peace with PT Arara Abadi, and Suryono is a partner of the company to develop horticulture and fruit farming. With considerable funding, PT Arara Abadi and Suryono support people who want to develop vegetables, fisheries, and fruits. Currently there are many farmer groups that are assisted to develop their agricultural business. In addition, they also attempt to make Tualang as a food center in the district of Siak, even Riau Province. Starting from a small group, the spirit of farming horticulture and fruit is now more vibrant, especially in Tualang sub-district.

Currently, there are a small number of people who also started to plant guava in the territory of Kuala Gasib and Tualang Timur. Pioneer of cashew planting is in Tualang Sub-district, especially along Prawang-Minas road. They are mostly migrants from Tanah Karo, North Sumatra. With the ethnic similarity of course there is a network that is formed, one of which is the spirit of improving the economy by growing guava. Unfortunately, due to the lack of land they have it has caused them to plant guava trees to the side of the road that is owned by government of Siak District. The location of the guava garden is located at 42 kilometer of Sumatran Highway, where this area is not included in the pipeline development plan, as it is before the zero spot.

6.4.2 Criminality

In some areas of oil palm plantations, palm fruit theft often occurs frequently, especially in the time leading up to harvest. According to information from residents, this condition tends to decline because the stolen palm fruit collectors are now no longer operating. Other information mentioned that in Tualang Timur Village there are many cases of theft in the homes of residents. Stolen goods are not luxury goods, but household goods such as water pumps, gas cylinders and water holding tanks. Some communities linked the high number of drug users in the village as a source of triggering theft of action.

6.4.3 Traffic Accident

Traffic accidents are also a frequent occurrence, both on Highways and Highways. Road conditions are relatively straight often tempt the rider to drive at high speed. Though the road conditions are not all good, there are many holes in some parts of the road. In addition, the lack of lighting on the highway also became one of the triggers of high number of traffic accidents, especially single accidents.

7 CULTURE

7.1 GASIB KINGDOM HISTORY

The Kingdom of Gasib is thought to rule in the 17th century, this kingdom was established before the Siak Kingdom. According to some sources, this kingdom is Hindu-Buddhist or pre-Islamic. The possibilities are it has to do with the weakening of Sriwijaya Empire with the presence of Islamic kingdoms in the Malay Peninsula as well as Aceh. Historical records show this kingdom was once in conflict with the kingdom of Aceh. The conflict was triggered by the desire of the Aceh King to marry a princess who is known by the name of Princess Mayang who was famous for her beauty. The proposal was rejected, the Aceh King was still Availablemant to marry the Princess, so he ordered his men to kidnap the Gasib King's daughter.

With a well thought strategy, the Aceh King's troops outwit the Gasib's royal forces. Most of them coming through the land route, not the river route which was the main traffic of the community at that time. These troops managed to outwit, they easily kidnapped a relatively unattended Princess Kaca Mayang. The Princess was taken away to Aceh. The Gasib King who was devastated by the incident asked the Commander Jimbam or Commander Raja Panjang who was famous for his might and magic to retrieve the Princess back to the palace. Long story short, the heavy built Commander managed to ravage the kingdom of Aceh and brought Princess Mayang home. Unfortunately, on the way back to the palace, the princess died. She was buried near the royal palace of Gasib. Heart broken by the death of his beloved daughter, the king and all the members of the kingdom chose to leave the palace. The kingdom disappeared with a few remaining relics.

The general opinion says that the name of Gasib is related to the tragic story. The first opinion is that associate the name of Gasib with "gaib" (lit. supernatural), because the mysterious disappearance of the kingdom, some people believe that the kingdom is actually a kingdom built by supernatural beings. After the event of the death of Princess Kaca Mayang, the king and his followers returned to the supernatural realm, his hometown. The

second opinion, the name Gasib associated with the word "nasib" (lit fate), this is related to the sadness of the king who became so sad after the loss of his beloved daughter. After that event, he often said "nasib", an expression of disappointment because of bad misfortune.

This story is quite familiar among the people of Siak and Pekanbaru Malays. In fact, it is said that the formation of the city of Pekanbaru is actually related to the story. Commander Jimbam is the first village opener in Pekanbaru. Precisely, after all members of the kingdom left, he opened a new village which is now known as Pekanbaru. The city was then developed as a transit point for merchant ships from and to the Kingdom of Siak, and now the capital of Riau Province.

7.2 CONSERVATION EFFORT ON MALAY TRADITION AND CULTURE

He is Arwin AS, a former Siak Regent who is currently languishing in Corruption Eradication Commission (KPK) detention because of corruption case of forest land, who was incessant expressing custom nuance in Siak District. His name is often linked by the community with efforts to revive Malay culture in the district that expansed from Bengkalis District since reformation time. Since 2015, the local government of Siak District has issued a local regulation that changed the term of the village into a "kampung", then the term for head of the village was replaced by "penghulu" and the village secretary became "kerani". These terms are the efforts of the local government to express the nuances of Malay Custom in government life. Related to that, there are certain times when all local government officials have to wear a customary Malay dress complete with a distinctive triangular head covering called "tajak", for men. In addition, there is a "dusun" structure that links between villages and hamlet in organizational structure in all villages in Siak District.

Figure 7-1 Silat (lit. self-defence art) Pangean Studio in Kuala Gasib Village

In addition, there are several other policies in the effort to promote Malay custom in Siak district. One of them is to establish Kuala Gasib Village as a custom village. Unfortunately, the determination of custom village was considered premature. There is currently no clear concept and regulatory framework to be used as a benchmark for the implementation of

customl villages. As a result, for the last year, Kuala Gasib Village is led by executive task person from the sub-district. The village postponed the selection of Pengghulu/ village head until there were clear rules governing the working mechanism for custom village. On the other hand, the people have prepared their customary head, Hasyim (65 years old). He said "I am appointed by the community for being elder, but until now there has not been a decree (decree). His duties for the time being is about custom during wedding, but not so yet ". In an effort to present the traditional village, currently in Suka Maju Hamlet founded a Silat Pangean studio. Silat Pangean is a typical Riau's Malay self-defence art, which is closely related to the Naqsabandiyah tarekat, so that the nuances of Islam is quite thick. One of them is, before practice the trainees have to take ablution water, because there is understanding that every movement in silat is part of worship to the Creator.

The appointment of Custom Village Kuala Gasib, actually also related to the existence of the grave of Princess Kaca Mayang in the area. However, there are no families associated with the tribe / kebatinan Gasib living in the area. However, there are minor voices that are quite strong especially among immigrants and also companies. According to Sutrisno (55 years old), one of the head of Neighborhood Association in Suka Maju hamlet, he is worried about the determination of custmary villages will revive the spirit of indigenous people to claim customary land. Obviously this will incriminate the immigrants as well as the company, because they already have a legal clarity on the land they have.

In addition, there is still social jealousy among immigrants with indigenous people. Although in terms of numbers they are more, but in terms of distribution of government aids they are always secondary. For example, such as home surgery assistance conducted by Siak District Government, most of the residents who receive it are indigenous Malays ethnic. So it is with the other aids. This is understood because most of the village administration apparatus is held by indigenous Malays ethnic. Nevertheless, now the indigenous people are getting more open, now there are many immigrants who served as head of Neighborhood Association and Hamlet in all study location villages.

7.3 CULTURAL HERITAGE REMAINS

According to some public figures there are many relics left of the Gasib Kingdom. One of the main relics and which is believed by many parties is the tomb of Princess Kaca Mayang. This tomb is located in Kuala Gasib Village, precisely within the palm oil plantation complex owned by PT Astra Argo Lestari. The tomb is on a hill right next to the company's palm oil processing plant. Not long ago the tomb was restored by Siak District Goverment and being promoted as one of the historical attractions. However, because of its location far enough from the main road and also its location within the company's heavily guarded plantation area, as a result there are still very few visitors who come for pilgrimage.

Figure 7-2 Princess Kaca Mayang's Tomb

The second tomb is the tomb of Princess Puan Elok. According Bahari, the head Tualang Timur Village, he got the story from previos elders. Aaccording to him, Princess Puan Elok is one of the children of the Commander in the kingdom of Gasib. He died of being stung by poisonous bees while planting rice. Now his grave is inside the PT AIP plantation complex, right inside the company staff housing complex. "I believe this is his grave, because according to the elders, its location on the banks of the Pingai river and one of the headstones was broken because it was hit by elephants" Bahari explained. According to one of PT AIP's manager, Suwarto, the company is committed to maintaining the tomb and not making it difficult for people who want to make pilgrimages. Until now, according to security workers in the company, there are still people who worship and pray at the tomb, even some residents have brought the head of the goat during the pilgrimage. Still according to the company's security worker, in the location of PT AIP plantation is actually a lot of old graves that can not be identified anymore. In fact, Gasib batin, Razali claimed to have never heard the story of the tomb of Princess Puan Elok.

Figure 7-3 Princess Puan Elok's Tomb

The next tomb is the tomb of Commander Jimbam or better known as Commander Raja Panjang. In fact, there is no clarity as to whether the two men were the same figure. According to community stories in Meredan and surrounding areas, the Commander Raja Panjang has a similarity with Commander Jimbam. However, people in Pekanbaru consider the tomb of Commander Jimbam is on the downstream of Tenayan River, precisely in

Sinapelan Village. The location of this tomb is on the high cliff edge of the Siak River, which is the boundary between Meredan with Melebung Villages which is also separates Siak District and Pekanbaru City. When visited by land, this tomb is located far from the community settlement. Then, it turns out there are many old tombs in the complex, it is estimated there are hundreds of tombs. The Tomb of Raja Panjang is the most striking tomb, because it has been restored with the ceramic floor on the right and left side. The large number of food and beverage packaging waste shows that the tomb is still frequently visited by the community.

Figure 7-4 Batin Gasib during Pilgrimate to Commander Raja Panjang's Tomb

In addition to these tombs, there are several other relics that are known to the public. One of the phenomenal is the boat moorings that exist on the edge of the Siak River. According to the society, the wood is very big and strong. They believe that the site was once the place where the royal ships were located. Now the location is no longer known.

Some people claimed the location is located within the area of PT Astra. In addition, there are people who claim to find some relics belonging to the kingdom of Gasib. One of them is Retno (33 years old), she admitted when she was still a small child she found a clay jar that very old. Currently she still keep it well and strongly believe that it is a relic of the era of the kingdom of Gasib. Indeed, there are many relics that existed before PT Astra opened plantations in the region. Objects such as jars, plates, and also crate were found by the community at that time.

Not many people know the detail of the Gasib Kingdom, let alone about the tomb and other relics. The thing they know for sure is the tombs are sacred. One of the elders in Meredan Village, Musa (63 years) said that recently there were people who tried to take the eaglewood in the burial complex of the Commander Raja Panjang. Haven't yet had time to cut the wood, the person was struck by a sudden heAvailableche. He went home and the next day died. In addition, Muhtar (65 years old) a community figure Pinang Sebatang admitted as a child often see oddities in the Gasib River. Starting from the emergence of 6 pieces magical cannon lline up, to an unusual wave when he was fishing in the river. Bahari, the Head of Tualang Timur Village also admitted he witnessed for himself how while he was still working in the forest, there was a heavy equipment trying to level the grave of Princess

Puan Elok. After trying several times it always fail, because the machine repeatedly dead when about to go to the tomb. Even Legimin (51 years) immigrants from Rantau Prapat who now live in Kuala Gasib really believe his village is guarded by the Invisible Tiger, the creature will appear if there are residents who violate the provisions of custom, especially the problem of immorality.

There are many more stories from the community that show Kuala Gasib Village, Gasib River, and the tombs have blessings and must be respected. Some of the others, remembered when it gambling was trend, a lot of people who try their luck in the sacred tombs were asking for a lucky number.

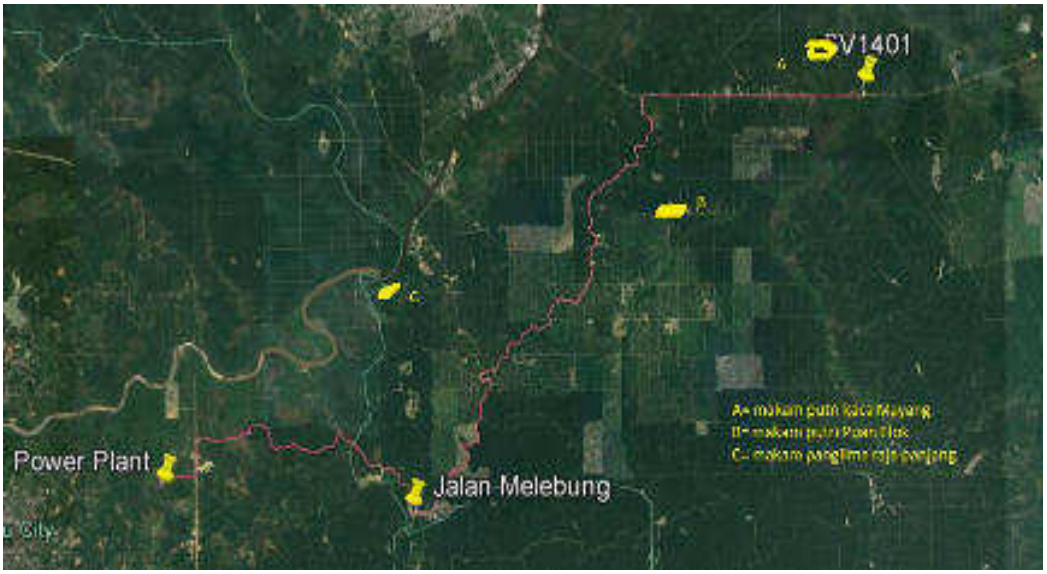

Figure 7-5 Satellite image of Cultural Heritage Sites

In the picture above, there are three points of grave location located in the study location, namely Kuala Gasib, Tualang Timur and Meredan Villages. Those three tombs' location are more than a radius of 2 Km from the gas pipeline. So it can be assumed that the existence of the gas pipeline will not disturb or affect the three sacred tombs in the study site. To find out more clearly the position of the grave against the gas pipeline it can be viewed on the map on the next page.

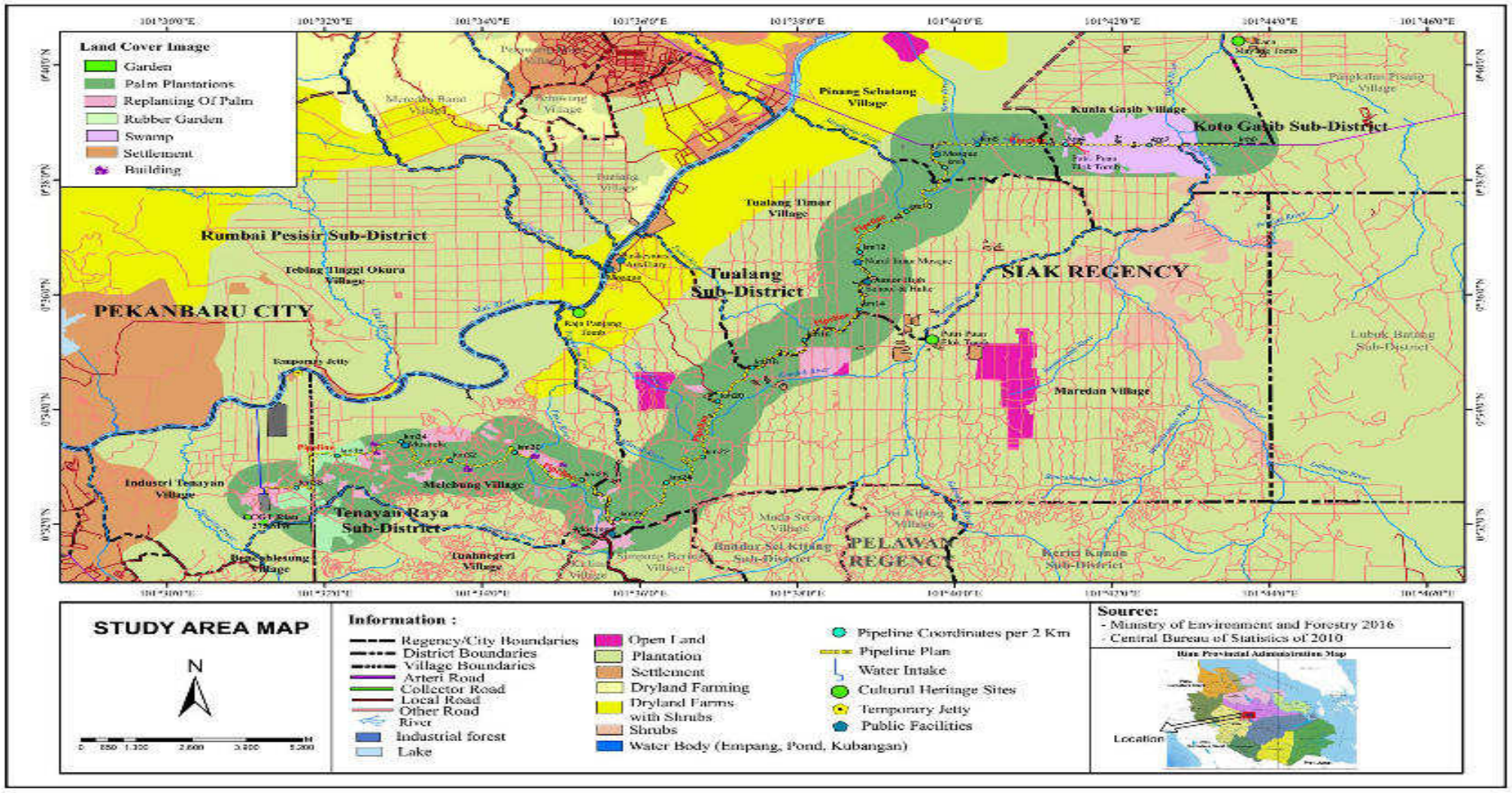

Figure 7-6 Map Location of Cultural Heritage Remains

8 EDUCATION

8.1 GENERAL VIEW OF EDUCATION

According to information from several sources at the study site, it is known that currently the expectation of parents and children in the study location to attend school is quite high. In contrast to at the beginning of the school was established in the year 80-90 which must 'guerrilla' to invite and seek students. Free school fees reduce the barriers of parents sending their children to school. Schools were also getting aids from plantation companies around the school for school activities and school physical construction. Currently the school graduation rate is very high up to 100%.

In general, the problems that become obstacles in the field of education in the villages of study sites are as follows:

- Distance of high school level is far from residential location;
- Bad condition for roads; and
- No public transportation for children to commute to school.

These problems become one of the obstacles in teaching and learning, even the condition of children dropping out of school. In addition, the unavailability of public transport facilities to schools has helped encourage under-aged children to go to school by riding motorcycles. According to Mr. Ruslan (Principal of State Elementary School /SDN 01 Kuala Gasib) and Mr. Muhtar (Head of Sekar MayangHamlet and former Head of Pinang Sebatang Village), students who continue to high school have to travel long distances by motorcycle although it is not yet legal for them to drive motorcycle . For students who live whitin the plantation site, they get help by the local companies in providing a school shuttle vehicle, either by bus or other vehicle.

This quite far distance is a significant obstacle especially for students who will continue to high school level, especially for people living in the village of Kuala Gasib, Sekar Mayang Hamlet in Pinang Sebatang Village, Tualang Timur Village, and Melebung Village.

For the villagers of Kuala Gasib and Pinang Sebatang, the nearest high school location is in the Buatan area. Mr Muhtar, Head of Sekar Mayang Hamlet, hopes that the realization of a high school located in one village between Kuala Gasib, Tualang Timur and Pinang Sebatang in Sekar Mayang hamlet so that the children of the three villages are not too far away to continue education to high school level. Meanwhile, Mr Ruslan (Principal of SDN 01 Kuala Gasib) is also thinking about the need to create a hostel near the high school location in Buatan especially for students from the village of Kuala Gasib.

In Melebung, students who want to continue to junior high school and high school of their choice are to continue their study to Maredan which is quite far away with the bad road condition. This condition makes the parents become understandable if the child does not want to continue school to high school level because of the long distance barrier.

8.1.1 School Numbers

Based on statistical data in BPS, it is obtained that the information related to education in the three districts of study locations, as shown in the following table:

Table 8-1 Numbers of School, Teacher, and Student in Three Sub-districts of Study Location Based on BPS Data Year 2017

Area	SD	MI	SMP	MTs	SMA	MA
Tenayan Raya Sub-District	35	4	2	7	6	4
Tualang Sub-District	33	4	19	2	12	1
Koto Gasib Sub-District	18	0	5	3	2	1

Source : BPS Pekanbaru Cityand BPS Siak Regency, 2017

These data are the accumulated data of all schools located in each sub-district of the study location. In the table above can be seen that the number of schools in the Sub-district of Koto Gasib are still very minimal when compared with two other districts. However, in general the number of schools is not enough to reach school-aged children residing in the inland villages, especially for junior and senior high schools.

To find out the real condition of education facility in study location, it can be seen from the village monograph data in each village as in table below:

Table 8-2 Number of Schools Data in Study Locations According to Village Monograph Data of 2017

Village	PAUD	TK	SD	SMP	SMA
Kuala Gasib	1	1	1	1	
Tualang Timur		1	1	1	
Pinang Sebatang	1	1	2	2	
Meredan	1	1	1	1	1
Melebung			1		

Sumber : Monografi Kuala Gasib, Tualang Timur, Pinang Sebatang, Meredan dan Melebung, 2017

In general, the number of schools in each village of study location is still very low, especially for Melebung Village where there is only one primary school. Whereas administratively Melebung Village is in the area of Pekanbaru City. While in other villages there are schools up to junior high school and for high school there is only one school in Pinang Sebatang.

Based on the results of the identification in the field, it is known that the availability of supporting facilities of educational services in the study sites, as shown in the following table:

Table 8-3 Availability of Support Facilities for Education Services

School	Education Facility Availability in Villages	Distance from Residential	Public Transportation
PAUD/ TK	Available in every Village	Near	No Need, Not Available
SD	Available in every Village	Near	No Need, Not Available
SMP	Not always available in every Village	Relatively Near	Relatively need, Not Available
SMA	Not always available in every Village	Realitively Far	Relatively need, Not Available

Source : Prime data, 2018

8.1.2 Students to Teachers Ratio

The ratio of students to teachers based on BPS data in the three study locations sub-district can be seen in the following table:

Table 8-4 Students to Teachers Ratio in the Study Location Sub-district Year 2016

Source : Data BPS Pekanbaru Cityand BPS Siak District, 2017

Table 8-5 Ratio of Minimal Number of Students to Teachers According to Government Regulation Number 74 Year 2008 About Teacher

AREA	SD	MI	SMP	MTs	SMA	MA
Kecamatan Tenayan Raya						
Student Number	13.529	951	21	1.689	3.298	1.138
Teacher Number	636	48	16	140	223	60
Rasio Murid terhadap Guru (%)	21,27	19,81	1,62	12,06	14,79	18,97
Kecamatan Tualang						
Student Number	17.226	922	1.534	155	5.712	84
Teacher Number	806	41	376	18	314	8
Student-Teacher Ratio (%)	19	12,67	17	9	16	11
Kecamatan Koto Gasib						
Student Number	3.256	0	938	307	627	74
Teacher Number	212	0	47	16	42	14
Student-Teacher Ratio (%)	15	0	10,2	18	14	7

Source : BPS Pekanbaru Cityand BPS Siak Regency, 2017

If you look at the Government Regulation in the above table, then the condition of the students to teachers ratio in the three study locations sub-districts can be explained as follows:

Table 8-6 Condition of the Number of Students to Teachers Ratio in Study Location Sub-districts According to PP. 74 Year 2008

Sekolah	Tenayan Raya Sub-district	Kecamatan Tualang	Kecamatan Koto Gasib
TK/RA	NA	NA	NA
SD	Exceeding the minimum limit of Government Regulation, the assumption: the number of teachers is still lacking	Below the minimum limit of Government Regulation, the assumption: the number of students in SD is still small	Inaccordance with the limit set by government
MI	Exceeding the minimum limit of Government Regulation, the assumption: the number of teachers is still lacking	Below the minimum limit of Government Regulation, the assumption: the number of students in MI is still small	NA
SMP	Below the minimum limit of Government Regulation, the assumption: the number of students in junior high school is still small	Below the minimum limit of Government Regulation, the assumption: the number of students in junior high school is still small	Below the minimum limit of Government Regulation, the assumption: the number of students in junior high school is still small
MTs	Below the minimum limit of Government Regulation, the assumption: the number of students in MTs is still small	Below the minimum limit of Government Regulation, the assumption: the number of students in MTschool is still small	Exceeding the minimum limit of Government Regulation, the assumption: the number of teachers is still lacking
SMA	Below the minimum limit of Government Regulation, the assumption: the number of students in High school is still small	Below the minimum limit of Government Regulation, the assumption: the number of students in High school is still small	Below the minimum limit of Government Regulation, the assumption: the number of students in High school is still small
MA	Exceeding the minimum limit of Government Regulation, the assumption: the number of teachers is still lacking	Below the minimum limit of Government Regulation, the assumption: the number of students in MA is still small	Below the minimum limit of Government Regulation, the assumption: the number of students in MA is still small

Sekolah	Tenayan Raya Sub-district	Kecamatan Tualang	Kecamatan Koto Gasib
SMK	NA	NA	NA
MAK	NA	NA	NA

Source : Prime data, 2018

8.1.3 Community's Education Level

The data in Table 8-7 shows a high drop out rate in the four study villages, namely Kuala Gasib, Pinang Sebatang, Meredan and Melebung. This is possible because of the lack of schools available in the area and as previously explained the long distant school distance is the factor that keeps the child away from school.

Table 8-7 Population's Education Level Data in Study Location

Village	Pre-School	SD/ MI	SLTP/ MTs	SLTA/ MA	S1/ Diploma	Dropped out	Illiterate / No Schooling
Kuala Gasib		607	94	56	22	226	46
Tualang Timur	828	1179	764	682	22		
Pinang Sebatang		708	648	629	142	1006	857
Meredan		928	550	482	92	602	772
Melebung	74	116	30	20	2	35	

Source : Monograph Kuala Gasib, Tualang Timur, Pinang Sebatang, Meredanand Melebung, 2017

8.1.4 Respondents Education Aspects

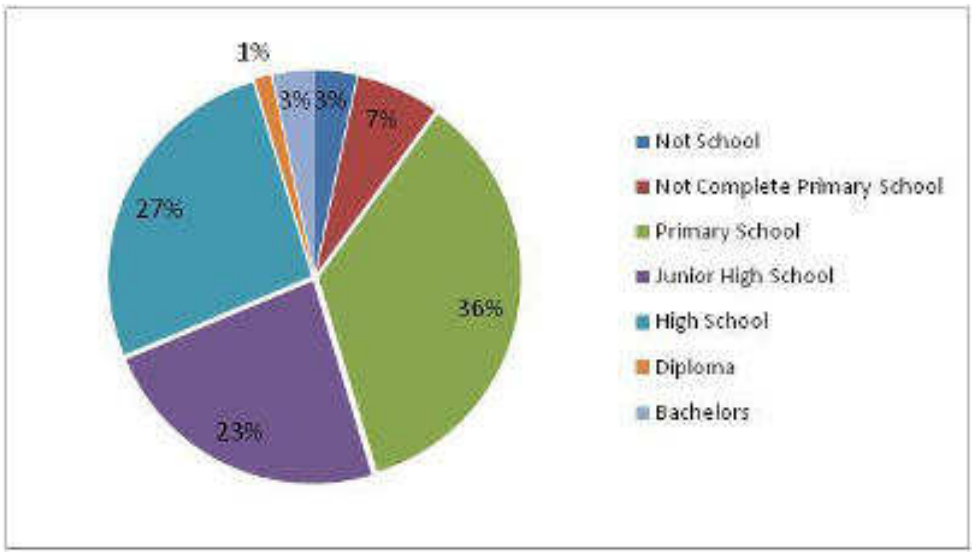

Figure 8-1 Graph of Respondent's Education Level In General

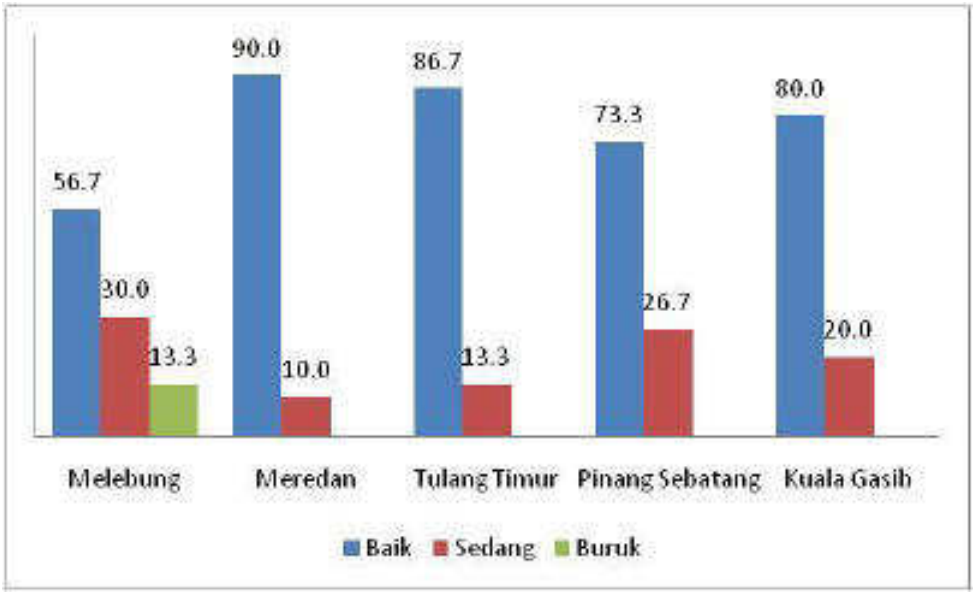

Figure 8-2 Condition of Education Facility According to Respondents

Based on household socio-economic survey, the majority of respondents stated that the condition of education facilities in the region is good. Then based on the survey results it can also be known the type of charges fee in schools as in the following table:

Table 8-8 Composition of School Fees Types

Fees Types	Available	No	No Schooling	Amount
Building Fees	11%	88%	1%	Rp 20.000 to 13.000.000
Uniforms	59%	40%	1%	Rp 75.000 to 5.000.000
Books	49%	50%	1%	Rp 10.000 to 1.500.000
Tuition	15%	84%	1%	Rp 5,000 to 6.000.000

Source : Prime data, 2018

The majority of respondents said there were school fees for uniforms and books, whereas a small proportion of other respondents stated there were school fees for building money and tuition fees. Types of school fees for building fees and tuition fees are generally for private high school or Islamic High schools.

9 HEALTH

9.1 GENERAL VIEW ON HELATH

9.1.1 Infrastructure and Medical Personel

In every village there is generally one Subsididary Public Health Centre (Pustu) and Village Policlinic (Polindes) where the condition is quite clean. District Health Office place a minimum of medical personnel amounting to 1 (one) midwife or nurse in both. Physical building of Pustu from Health Office while Polindes from village. In addition to providing

public health services, both (Pustu and Polindes) become the motor activities of Integrated Service Post (Posyandu) in villages that provide health services for pregnant women, toddlers and the elderly.

The lack of medical staff in Pustu and Polindes, which is generally only one medical staff, has limited health services for the villagers. As happened at the Tualang Timur Village Health Post (Poskesdes) when the village midwife is on maternity leave, the residents can not be served because there are no subtitute midwifes. Therefore, the public is forced to seek health services at the nearest Pustu or Polindes locations in other villages. Likewise in Pustu of Melebung Village, the midwife in charge is not living in the village so that only can provide a short service for the Melebung villagers. Therefore Melebung villagers are forced to go to nearby Pustu in Maredan village or have to cross the river to get medical services if they are sick. Health facilities and medical personnel in the study location based on BPS data Pekanbaru and Siak Regency can be seen on the following tables:

Table 9-1 Number of Puskesmas, Mobile Puskesmas, Subsidiary Puskesmas, Polindes / Poskesdes, and Posyandu in Study Sites

Area	Puskesmas	Puskesmas		Polindes/ Poskesdes	Posyandu
		Mobile	Subsidiary		
Koto Gasib Sub-District	1	0	7	11	28
Tualang Sub-District	2		8	8	55
Kuala Gasib Village	0	0	1	1	6
Pinang Sebatang Village	0	0	1	1	5
Tualang Timur Village	0	0	0	1	3
Maredan Village	0	0	1	1	9
Melebung Village	0	0	1	0	3

Source: Data BPS Pekanbaru Cityand BPS Siak District, 2017; Data Pustu Melebung, Meredan, Tualang Timur, Pinang Sebatangand Kuala Gasib, 2018

Table 9-2Jumlah Tenaga Kesehatan di Lokasi Studi

Area	Specialist Doktor	Physician	Dentist	Nurse	Midwife	Healer
Koto Gasib Sub-District	0	4	2	20	33	37
Tualang Sub-District	0	10	4	40	43	5
Kuala Gasib Village	0	0	0	1	1	
Pinang Sebatang Village	0	0	0	0	2	
Tualang Timur Village	0	0	0	0	1	
Maredan Village	0	0	0	0	6	
Melebung Village	0	0	0	0	1	

Source: Data BPS Pekanbaru City and BPS Siak District, 2017; Data Pustu Melebung, Meredan, Tualang Timur, Pinang Sebatangand Kuala Gasib, 2018

9.1.2 Health Service, Medicine Supply and Treatment Fees

Pustu is the main reference for general illness, while Polindes is closely related to maternal and child health services. Health workers generally stay at Pustu and Polindes. They serve 24 hours a day and even come to the community in case of urgency, such as when helping childbirth.

Pustu and Polindes have room to stay for mother who will give birth. In Polindes and Pustu, the public receives routine pregnancy screening services, but because they do not have tools for ultrasound, it is recommended that at least one examination with an ultrasound device to monitor health at the same time the day of pregnancy is estimated at the end of pregnancy at the sub-district Puskesmas or other health services which has ultrasound tools.

Until now the availability of medicines in Pustu and Polindes is always maintained, including the availability of vaccines for Posyandu's immunization activities which were picked-up some time in the sub-district before immunization activities due to unavailability of adequate vaccine storage equipment.

So far there is no medical fee for local residents who seek treatment in Pustu and Polindes, either for those who have BPJS, KIS, or other health insurance or who have no guarantee whatsoever. The community can be treated free of charge up to the sub-district Puskesmas level. Further referral of treatment that can not be served by Pustu is also issued by Pustu to get treatment service to Puskesmas and so on to higher level of health service.

9.1.3 Posyandu (Integrated Service Post)

Posyandu medical personnel in the village are midwifes and / or nurses of Pustu and Polindes by establishing a Posyandu (5 Posyandu) cadre of 5 persons, namely:

- Chief
- Secretary
- Treasurer
- Member
- Member

The Posyandu every month are doing routine activities such as weighing and immunization for toddlers, and gymnastics for the elderly. Posyandu activities are centered in Pustu or in Polindes or in village-owned buildings used for Posyandu to be easily accessible by the community. There are several groups of Posyandu in the village to be easily reachable. Generally, malnourished toddlers rarely encountered, most toddlers get good nutrition. The community seemed to be enthusiastic to participate in Posyandu activities of children including immunization.

9.2 DATA of 10 COMMON COMMUNITY DISEASES

Each Pustu is recording every patient's illness from the community who came. Officers at Pustu will also make statistical notes on the 10 most common diseases experienced by people who seek treatment in Pustu and record the most medicinal use.

Types of ARI disease are listed at the top rank in Tualang Timur Poskesdes in 2017 and so are in Pinang Sebatang Pustu on year 2016. ARI also occupy the kind of middle-ranking disease in Kuala Gasib Pustu and Maredan Pustu. According to the officials of Pustu and Poskesdes, the emergence of ARI disease can be related to:

- Air polution, for example from factory smoke or forest fires;
- Dust;
- Weather changes;
- Heat of Prolonged draught;
- Immune Condition.

In Kuala Gasib, according to Pustu officer, Mr Andri, the number of ARI sufferers is still in a reasonable condition and does not seen the specific cause so it has not felt necessary to take action with special attention. Similarly, the conditions in Maredan Pustu.

While in the Tualang Timur Poskesdes which shows the top ranking records for the type of ARI disease, according to Midwife Dewi it can be related to smoke pollution from the factory that operates around residential area and also other supporting factors. Pustu Officer of Pinang Sebatang Village also said the same thing that the ARI could be related to the smoke haze of the factory in addition to other supporting factors.

The midwife Dewi said she would consult Tualang Puskesmas about the need for socialization and joint efforts in responding to the ARI disease at the village level. The same response was also made by Mr. Dedi as Head of Maredan Meredan who will communicate with Head of Tualang Puskesmas to find solution about how to overcome the problem of ARI in area of Tualang Sub-district and Maredan. Mr. Muhtar, Head of Sekar Mayang Hamlet of Pinang Sebatang Village threw the idea to create a special clinic with medical experts about ARI which will be fully supported by PT Indah Kiat. Meanwhile in Melebung Village there was no information about the condition of 10 main diseases because of the difficulty in communicating directly or via telephone with pustu officers who served in the Melebung Village.

Pak Muhtar, the head of Pinang Sebatang Village, said that the people who live on the edge of the river such as Melebung, Maredan and Pinang Sebatang villages generally bathe in the Siak River causing many people suffering from skin diseases. This is what causes skin diseases are included in the 10 most diseases experienced by residents in the villages. In addition to affecting the health of the people in their respective homes, the difficulty of clean water also affects the cleanliness and health of the school environment, as experienced by schools in Tualang Timur, Maredan, and Melebung.

KLL / trauma caused by traffic accidents or accidents in the workplace also appears on the data of 10 main diseases, one of which is pricked by the oil palm thorns. Age-related diseases, such as rheumatics, also appear despite young-age patients. Community behavior such as irregular eating, lack of nutritious food, smoking, lack of hygiene (bathing in the river) also thought has helped to support the emergence of 10 types of major diseases. So far there is no data of HIV patients in the study location village.

The details of the 10 main types of diseases that are experienced by the community in the study locations are based on data recap at Pustu of each village can be seen in the following table:

Table 9-3 Data of Communty's 10 Major Diseases in the Study Location

Kuala Gasib		Pinang Sebatang		Tualang Timur		Maredan		Melebung	
Disease	**Patients**	**Disease**	**Patients**	**Disease**	**Patients**	**Disease**	**Patients**	**Disease**	**Patients**
Influenza	358	ARI	152	ARI	274	Influenza	624	NA	NA
ARI	315	Skin	32	Rheumatic	159	Skin	270	NA	NA
Gastritis	236	Psycological	27	Influenza	147	KLL/Trauma	145	NA	NA
Rheumatic	206	Gastritis	26	Skin infection	123	Rheumatic	125	NA	NA
Trauma	161	KLL/Trauma	25	Gastritits	105	ARI	101	NA	NA
Hypertension	115	Diarrhea	19	KLL/Trauma	91	Gastritis	100	NA	NA
Diarrhea	90	Influenza	18	Diarrhea	86	Dental	74	NA	NA
Caries	70	Caries	15	Mialgia	85	Diarrhea	59	NA	NA
Stomatitis	55	Rheumatic	14	Mata	63	Hypertension	38	NA	NA
Disentri	45	hypertension	13	Dental	60	Eye	29	NA	NA

Source : Data Pustu Kuala Gasib, Pinang Sebatang, Tualang Timurand Meredan, 2018

The data for 10 major diseases in Melebung Village is not available, because Pustu officers are rarely in place and data in Puskesmas of Tenayan Raya District is also difficult to access. So the data used is the accumulative data recap of Tenayan Raya District in 2016 from Pekanbaru City Health Office. Here are the top 10 disease data in Tenayan Raya District:

Table 9-4 Data of 10 Major Disease in Tenayan Raya District of 2016

Kind of Main Disease	Number of Patients
1. ARI	553 org
2. HYPERTENSION	350 org
3 .DIABETES MELLITUS	255 org
4. FEVER	154 org
5. SKIN INFECTION	97 org
6. GASTRITISand DUODENTITIS	93 org
7. PULPAand PERIPIKAL	86 org
8. IMUNIZATION DPT	72 org
9. DIARRHEA	68 org
10. DERMATOSIS	66 org

Source : Dinas Kesehatan Pekanbaru City, 2017

9.3 COMMUNITY'S SANITATION

The availability of clean water sources is quite difficult to obtain by the community in the study location, especially in the location of settlements that are on the edge of the Siak River. The water from the borehole located at Midwife Dewi's house in Tualang Timur looks yellow. While at the location of the ring wells in Sekar Mayang hamlet Pinang Sebatang village, the resulting water looks reddish.

Therefore, for drinking water the community needs to buy water refill gallon if they are capable enough. For those who can not afford they are forced to cook well's water. For toilet

facilities (toilet washing latrines), people who can afford it are buying clean water for Rp 35.000 / 1000 liters. Drilling wells were conducted in several villages such as Kuala Gasib (3 boreholes), Sekar Mayang hamlet of Pinang Sebatang village (8 boreholes), and Pamsimas in Tualang Timur but not yet operated until now. While in Melebung, only a few families have drilled wells.

Table 9-5 The Precentage of Community's Clean Water Source

Resident's Access to Clean Water	Kuala Gasib	Pinang Sebatang	Tualang Timur	Maredan	Melebung
- Dug well/ hand pump	90%	90%	90%	10%	10%
- Protected spring pipeline	-	-	-	-	-
- Pipeline from river	-	-	-	-	-
- River/ ponds	3%	-	-	90%	70%
- Rain Water Container (PAH)	-	-	-	-	3%
- PDAM	-	-	-	-	-
- Other	-	-	-	-	-

Source : Prime data, 2018

In addition, based on the results of observations and interviews in the field, information related to bathing, washing and toilet facilities was found. In general, the community in the study location are using or have a toilet or a bathroom for the purpose of bathing, washing and toilet. But there are still residents who live on the riverbank who use the river as a means of bathing, washing, and toilets.

Then for the garbage problem due to the absence of waste management by the village then the community manages their own household waste by burning, where almost all residents in the survey location do this way. There are also people who throw garbage in any place or throw garbage into the river.

There is no integrated sewer / trench between residential houses as a household waste disposal channel. Residents dispose of their liquid waste (household waste such as wastewater from the bathroom and wash) into the backyard of the house, allowed to seep or evaporate. Because the distance between homes rather far apart (unlike housing in the city) then it seems not to interfere with each other if disposing liquid waste at each other backyards.

9.4 HEALTH AND SANITATION ASPECTS

9.4.1 Treatment of Respondents and Health Services

In the case of treatment measures, the majority of the villagers in the study location villages chose to seek treatment from a health worker. Based on the result of household survey, it is known that the majority of respondents in the study location villages chose to go to health workers. Then from the survey results it is also known that the opinions of respondents about the condition of health services in their region, where the majority of respondents think health services in their region is good.

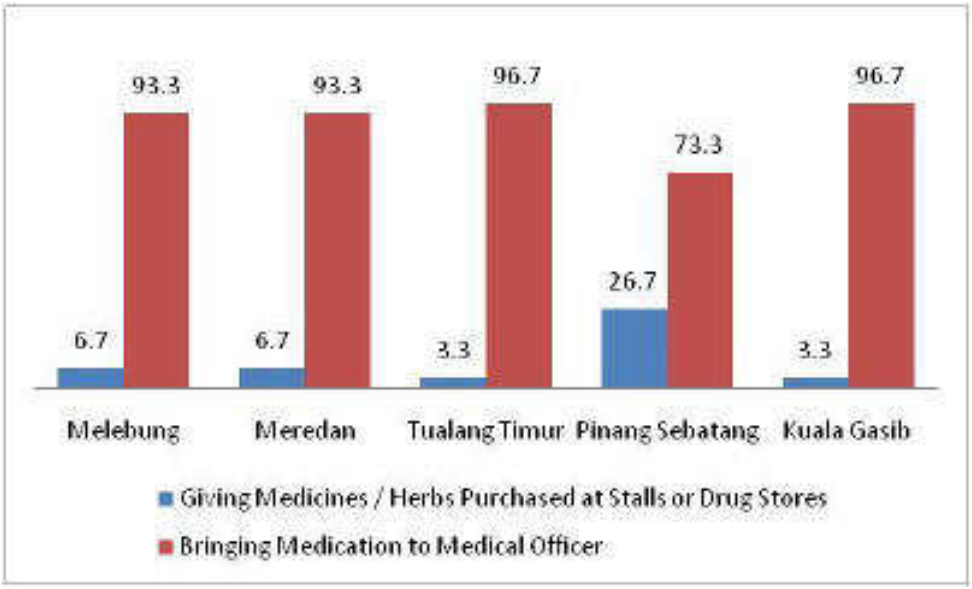

Figure 9-1 Graph of Respondent Treatment

Citizens also generally feel that the availability of health care facilities is sufficient. It is also in line with the survey data showing respondents' views on the condition of health services in their region, where the majority of respondents perceive health services in their areas are good enough.

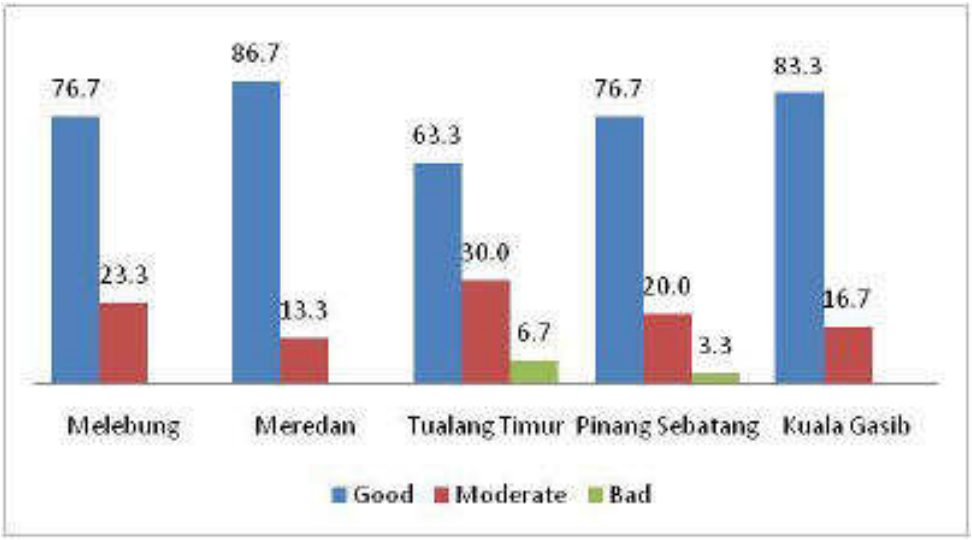

Figure 9-2 Graph of Respondent's View about Health Service

9.4.2 Health Insurance

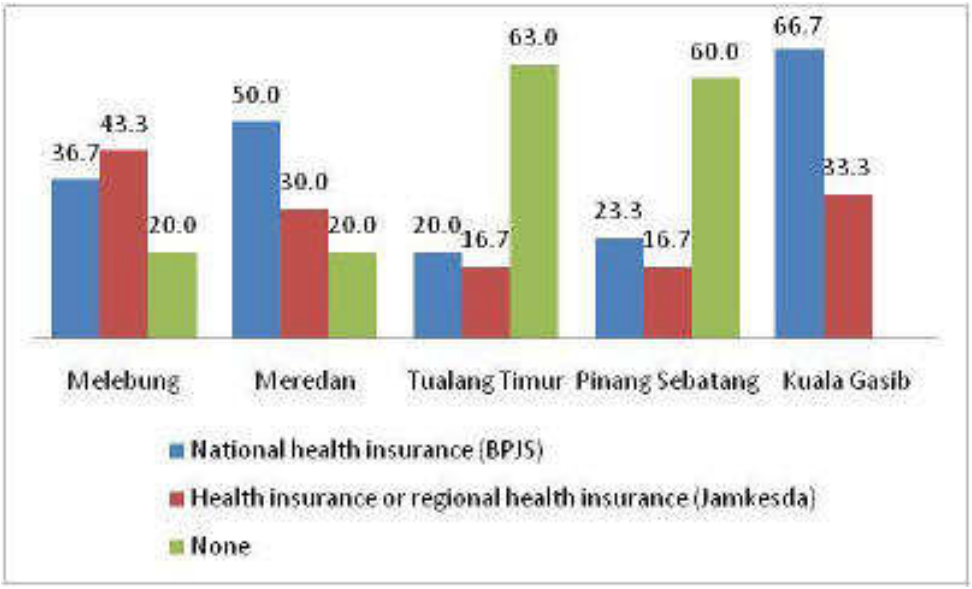

Figure 9-3 Graph of Respondents' Health Insurance Ownership

On the above graph, it can be seen that the majority respondents in the household survey conducted in Meredan and Kuala Gasib have BPJS. While in Melebung, the majority of respondents have Jamkesda (Regional Health Insurance) and the percentage of respondents who have BPJS is also quite large.

However, it is different with respondents residing in Tualang Timur and Pinang Sebatang, where the majority of respondents have no health insurance either BPJS, Jamkesda or other health insurance.

9.4.3 Respondents' Bathing, Washing and Toilets Facilities

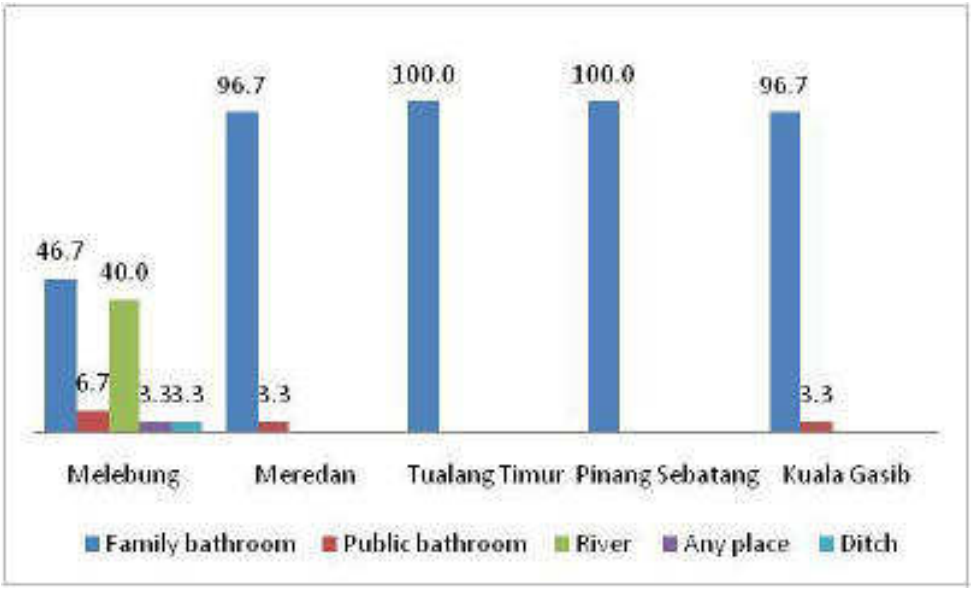

Figure 9-4 Graph of Respondents' Bathing, Washing and Toilets Facilities

Based on the household survey result, it is found that the majority of respondents in the study location villages already have latrines or family bathrooms as a means of bathing,

washing and toilet (MCK) in their homes. Specifically, the respondents in Melebung who many were still using the river as a means of MCK.

9.4.4 Household Garbage and Liquid Waste Management

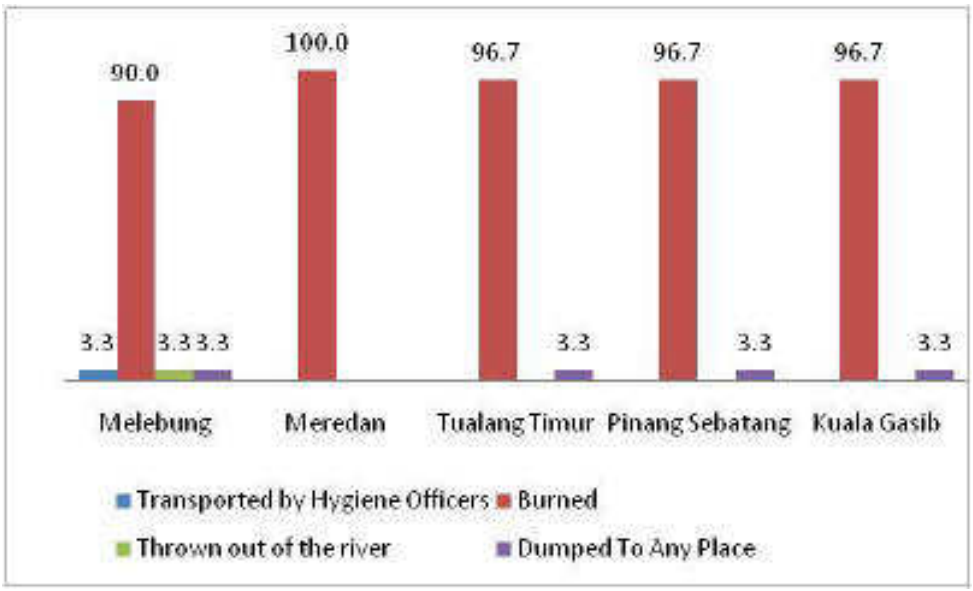

Figure 9-5 Graph of Respondent's Waste Management

Based on the household socio-economic survey result, it can be seen that the majority of respondents in the study locations manage their household waste by burning. And there is a small percentage of respondents who throw garbage into the river and to any place.

As for the management of liquid waste, the majority of the respondents drain it into the river or into a ditch or puddle in the house yard. No respondents have made septic tanks for the management of their household wastewater.

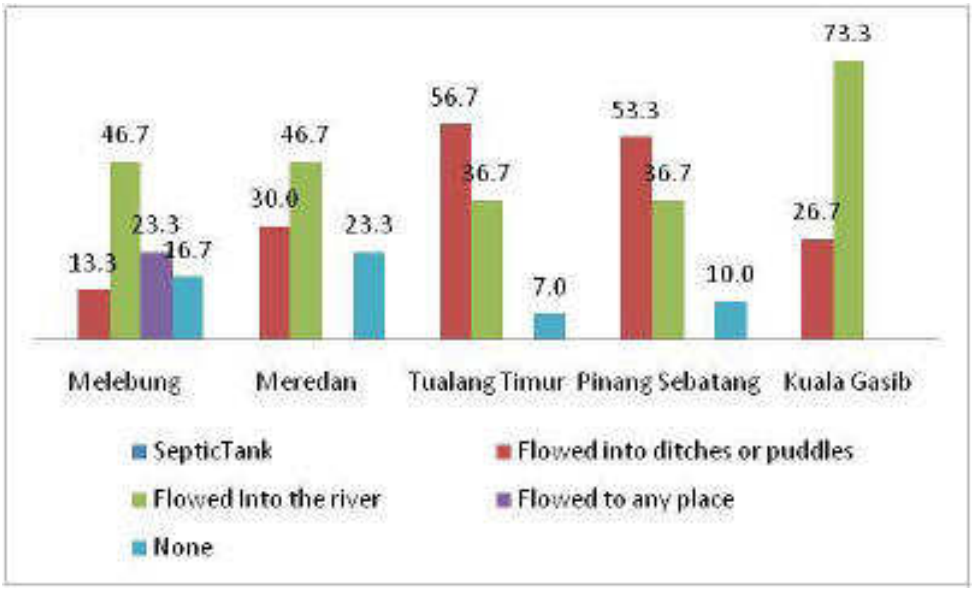

Figure 9-6 Graph of Respondents' Liquid Waste Management

10 HOUSEHOLD'S SOCIO-ECONOMIC SURVEY

10.1 RESPONDENT'S PROFILE

10.1.1 Respondent's Household

As it is known that based on household socio-economic survey, it can be identified the composition of respondents by sex consists of 51% male respondent or as many as 76 male respondents and 49% female respondents or as many as 74 female respondents. This shows that the composition of respondents by sex is quite balanced between men and women.

Of the composition, 92% of male respondents were head of household and 8% of female respondents were head of household. In contrast, there are 8% of male respondents and 92% of female respondents. Some 8% of those female heads of households generally work as farmers or trader (See **Table 6-3**).

Based on the survey results, it can also be known that the average number of family members of the majority of respondents in the study location is around 3 - 4 family members. The composition of the number of family members of respondents can be seen in the following graph:

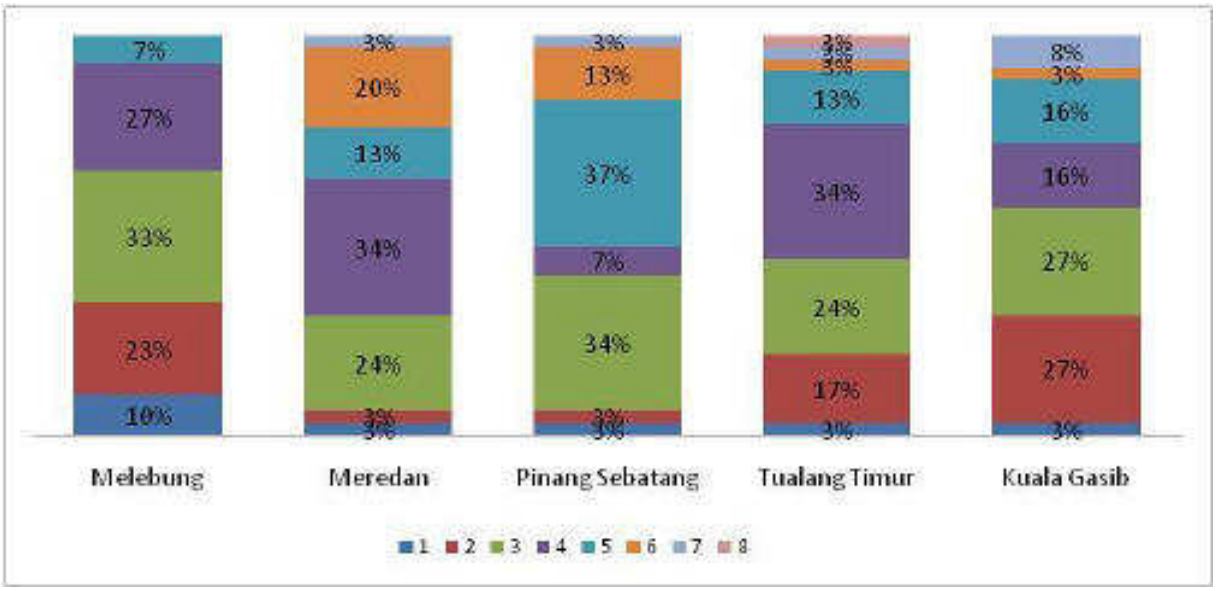

Figure 10-1 Graph of Respondent's Family Members Composition

However, the survey results show different trends in Pinang Sebatang village, where the majority of respondents as much as 37% have family members 5 people. And there are a small number of respondents in Meredan, Pinang Sebatang, Tualang Timur and Kuala Gasib Villages who have family members of more than 5 people (6 - 7 persons), even in Tualang Timur Village there are respondents who have family members up to 8 people.

Then also known that the the number of people composition who live in the respondents' homes. The majority of respondents in four study location villages, Melebung, Meredan, Tualang Timur and Kuala Gasib, stated that the number of people living in their homes are 3

- 4 people. The composition of the number of people living in one respondent's house can be seen in the following table.

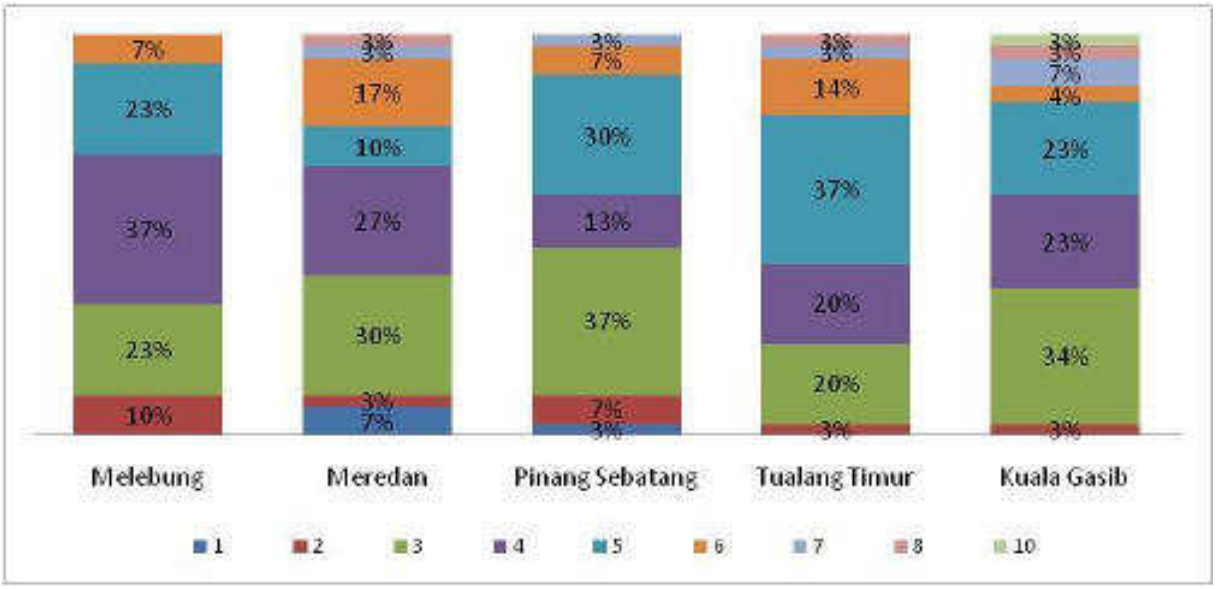

Figure 10-2 Graph of Number of People Composition Living in Respondent's House

With the number of family members and the number of residents of the house as explained above, it does not reduce the respondents household ability to meet the needs of family meals in a day. Based on survey results, 97% of respondents stated that their family ate three meals a day and only 3% of respondents stated that their families ate twice a day.

10.1.2 Respondent Composition Based on Age Group and Settling Duration

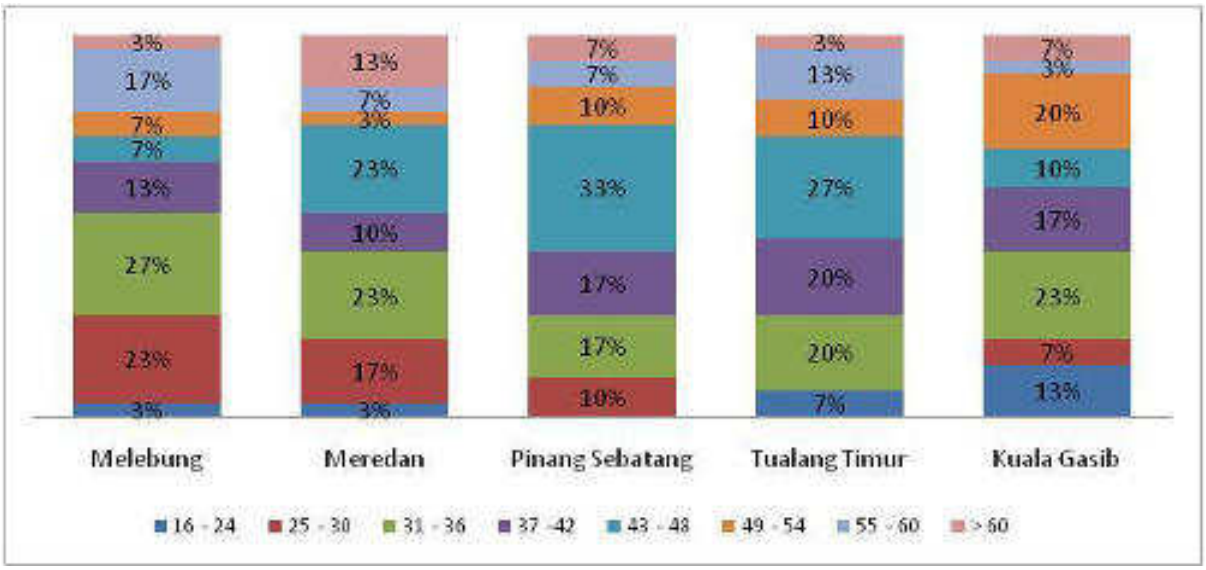

Figure 10-3 Graph of Respondent Composition Based on Age Group

In big picture, it can be seen that most of the respondents are in the productive age, which is 16 to 60 years old. Only a small percentage of respondents considered elderly (age above 60 years old) and the composition of the most elderly respondents were in Meredan Village, ie 13% of respondents.

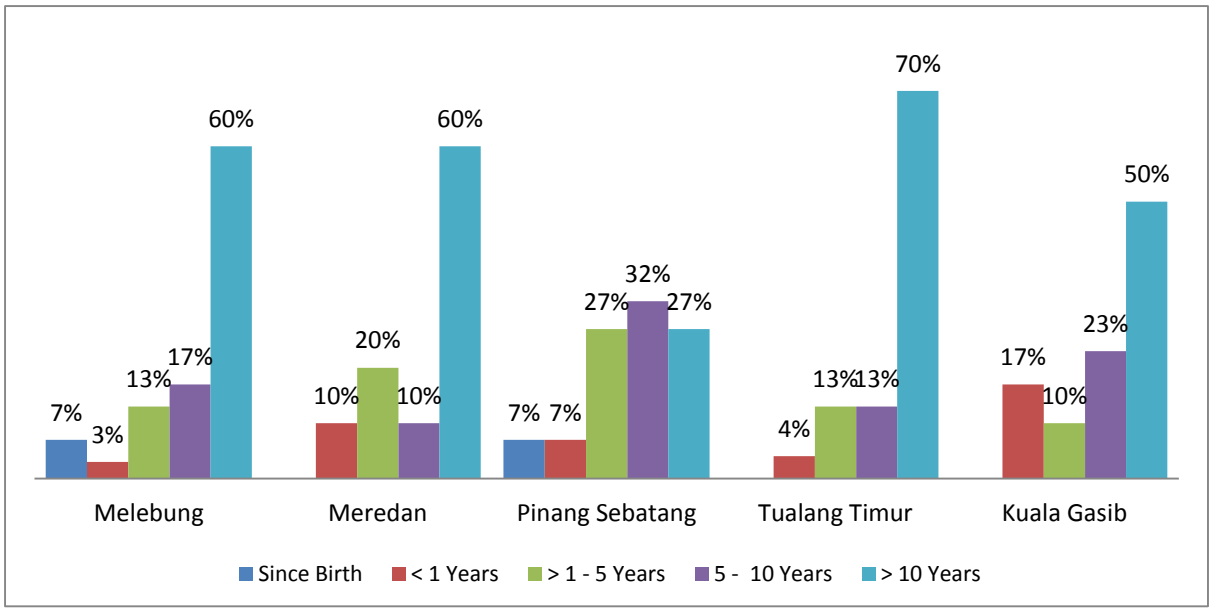

Figure 10-4 Graph of Respondent Composition Based on Settling Duration in Study Location

In Figure 10-4 it can be seen the respondents composition by settling duration in the study location. The majority of respondents in each study location Village have been living for more than 10 years. Then from the picture above, it can be seen that there are only 7% of respondents in Melebung Village and 7% in the village of Pinang Sebatang who have settled since birth.

10.1.3 Respondent Composition Based on Religion and Ethnicity

Based on the results of the socio-economic survey conducted, it is known that the majority of respondents in the five study sites are Muslim villagers and a few others are Christian Protestants and Catholics.

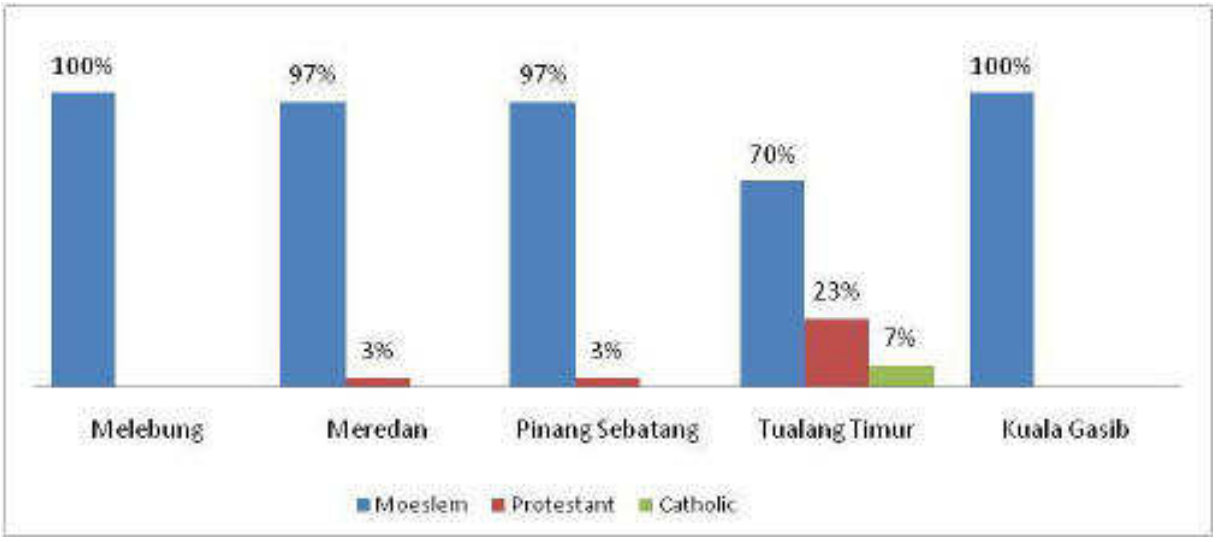

Figure 10-5 Graph of Respondent Composition Based on Religion

Then, if based on ethnicity, the household socio-economic survey results indicate that there are four major ethnicities in the study location villages, namely Malay, Javanese, Batak

people and Minang people with different composition in each village. There were also two ethnic minorities from respondents such as Nias People and Ambonese in Melebung Village.

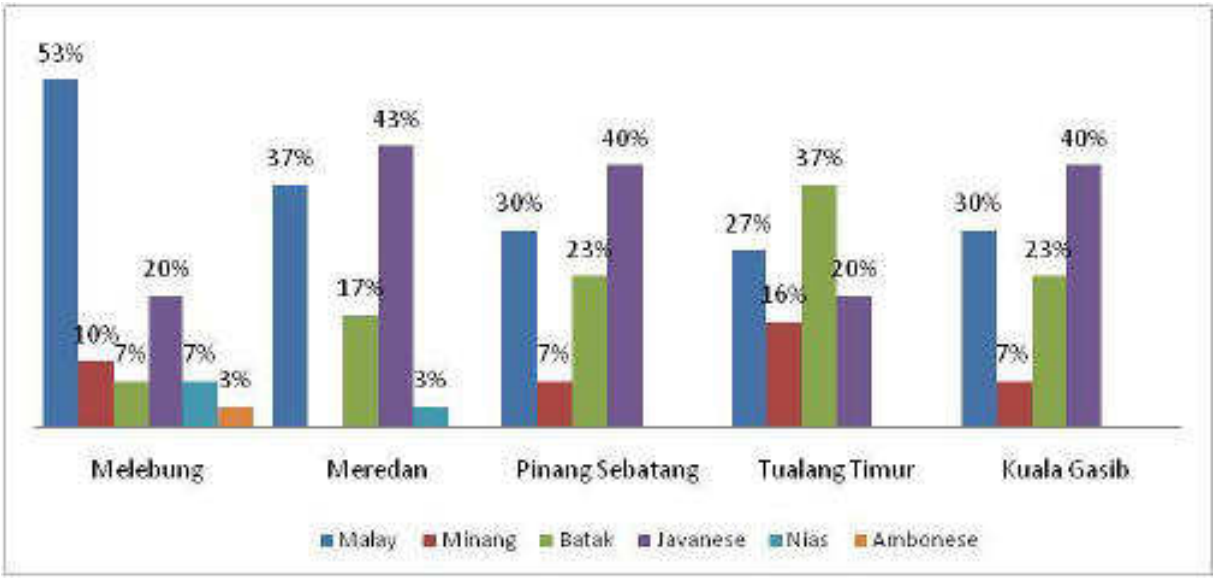

Figure 10-6 Graph of Respondent Composition Based on Ethnicity

10.2 HUMAN RESOURCES

10.2.1 Respondent Composition Based on Education Level

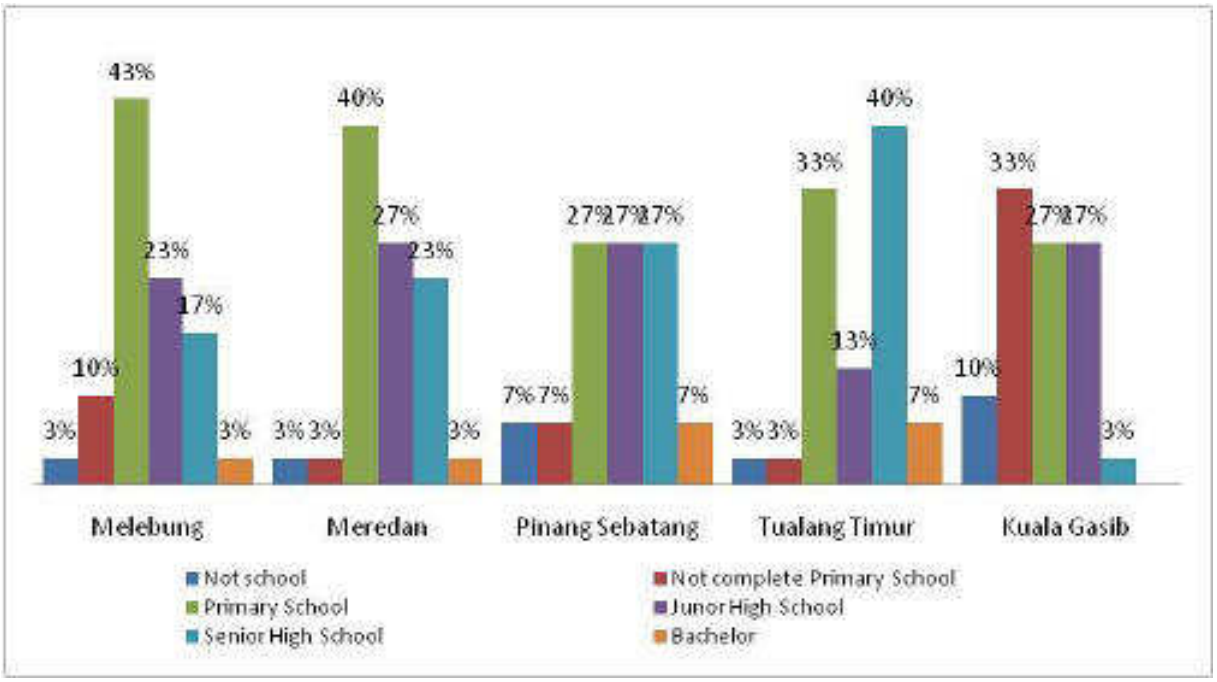

Figure 10-7 Graph of Respondent Composition Based on Education Level

As explained in the previous discussion that the general picture of respondents' education level in general is relatively low. In the graph above it can be seen that the education level of respondents in the Melebung Village are quite low with there are as many as 43% of respondents who have primary education level and as many as 10% of respondents did not

complete primary school and as many as 3% of respondents who are not in school. While there are as many as 23% of respondents who have junior high school education and as much as 17% of respondents who have high school education level. Only 3% of respondents have undergraduate education.

Then, for Meredan Village, it is known that as many as 40% of respondents have primary education level and 27% of respondents have junior high school level. While there are as many as 23% of respondents who have high school education level and as many as 3% of respondents who have a degree of undergraduate education. Only 3% of respondents did not complete primary school and 3% of respondents were not in school. For Pinang Sebatang Village, it is known that there are 27% of respondents who have elementary education level, junior high and high school. Then, as many as 7% of respondents who did not complete primary school and as many as 7% of respondents who did not attend school. Only 7% of respondents have undergraduate education.

Furthermore, for Tualang Timur Village, it is known that there are 40% of respondents who have high school education level and 33% of respondents have elementary education level. Then as many as 13% of respondents who have junior high school education and 7% of respondents who have undergraduate education level. Only 3% of respondents did not complete primary school and 3% of respondents were not in school. Finally, for the village of Kuala Gasib, it is known that there are as many as 33% of respondents who did not complete primary school and there are as many as 27% of respondents who have primary education level. Then, there are as many as 27% of respondents who have junior high school education and 3% of respondents who have high school education level. While there are as many as 10% of respondents who are not in school.

10.2.2 Respondent Composition Based on Livelihood

Based on the survey results obtained the main livelihood data of respondents, as shown in the graph in **Figure 10-8**. This main livelihood is the main source of household income earned from the work of the head of the family. The majority of respondents in the five study location villages have primary livelihoods as farmers and laborers.

The composition of respondents based on this main livelihood is a description of the general condition of the community in the five study location villages. Where most of the people work as farmers and laborers and other informal sectors such as trade, drivers, entrepreneurship, carpentry or other. The main livelihood of these respondents is influenced by the education level of the majority of respondents which is relatively low.

However, only a small proportion of respondents said they did not work, namely in Pinang Sebatang and Tualang Timur. It is also more influenced by the age factor and physical condition of respondents, where the respondents are elderly or in sick condition. The results of this survey indicate that communities in the study location villages are not short of employment, although the type of work available is in the informal sector.

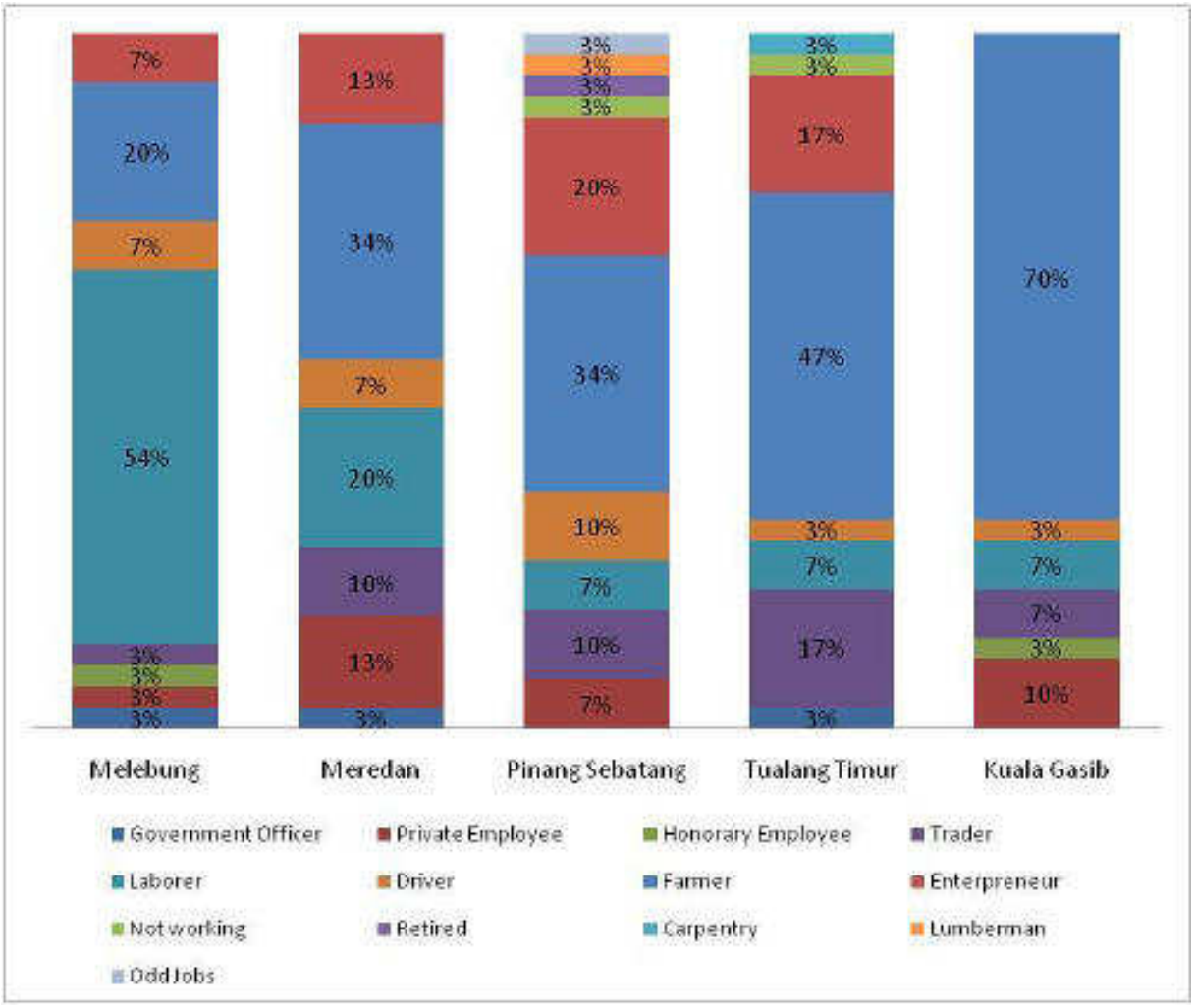

Figure 10-8 Graph of Respondents' Household Main Livelihood Composition

The main livelihood as farmers is stated by respondents in the village of Kuala Gasib, which is 70% of respondents. The main livelihood as farmers are also widely expressed by the majority of respondents in Meredan, Pinang Sebatang and Tualang Timur Village. This condition can be understood because in the area of these villages there are still many farms and gardens owned by the community.

Unlike the case with respondents in Melebung Village, where the majority of respondents, that by 54% of respondents stated that the main livelihood of their household is as laborers. This is due to the fact that agricultural land or community plantations in Melebung Village are very minimal, where most of the land in this area is privately owned by company.

As for household's side livelihoods it is known that the majority of respondents in the study sites stated no side livelihoods. The household livelihoods that many respondents stated were farming and trading. Generally these side livelihoods are done by wives and are only part-time. Or work that can be done at home like a shop or kiosk business. Respondents' side livelihoods can be seen in the following graph:

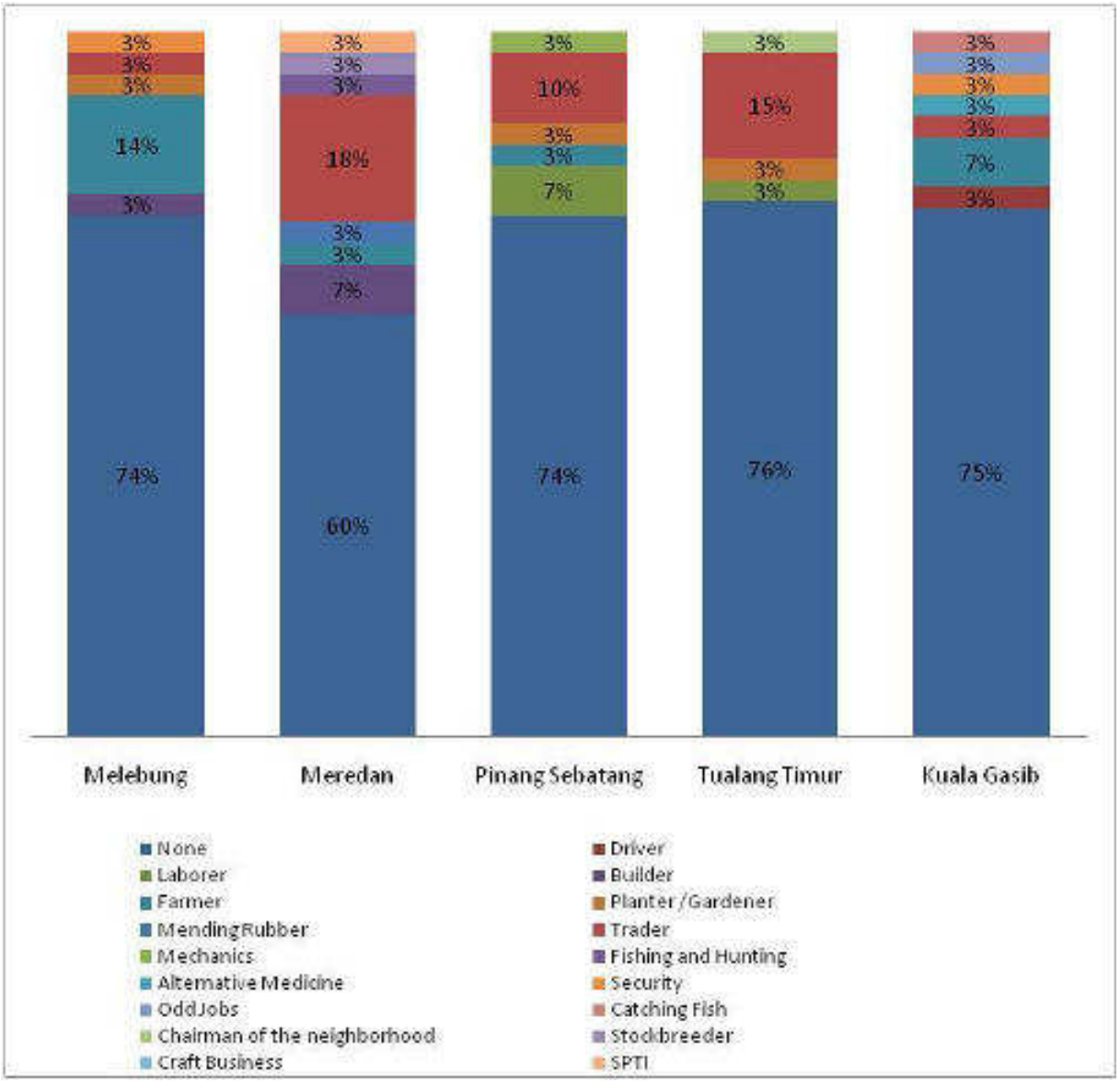

Figure 10-9 Graph of Respondents' Household Side Livelihood Composition

10.2.3 Respondent Composition Based on Skill

In relation to livelihoods, in addition to being influenced by the level of education is also influenced by the skills factor owned by respondents. In the graph in **Figure 5-10** it is known that the main skills of the majority of respondents in the five study location villages are farmers. And most of the other respondents have trade skills. However, in Melebung Village, the second largest composition is the unskilled respondents. Thus it can be understood if the people in Melebung main livelihood as laborers. In addition to being affected by skills constraints, the condition is also affected by low levels of education, lack of ownership of capital and land assets.

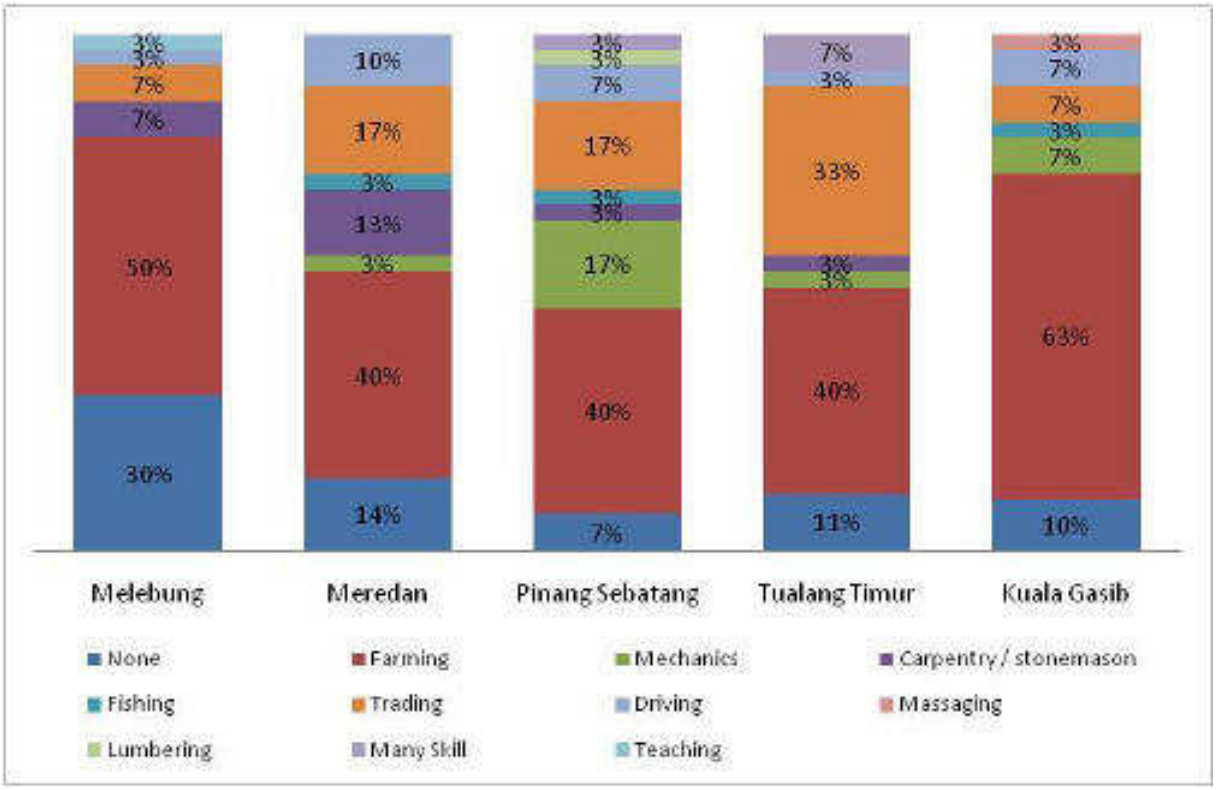

Figure 10-10 Graph of Respondent's Household Head's Main Skill Composition

To support the side livelihoods, it is also require a special skill. In **Figure 10-11** it can be seen that the majority of respondents in the five study location villages have no additional skills to support side livelihoods and most of the other respondents possess trade or farming skills.

This type of trade or farming support skills is related to the livelihoods of most respondents, ie as traders or farmers. Then the majority of respondents who do not have support skills, represent the majority of respondents who do not have household side livelihoods.T

Howeve, thhe source of skills owned by the respondents both the main skills and support skills, the majority obtained by self-taught. Only a small proportion are obtained from generation to generation or through the course, not more than 3% of respondents.

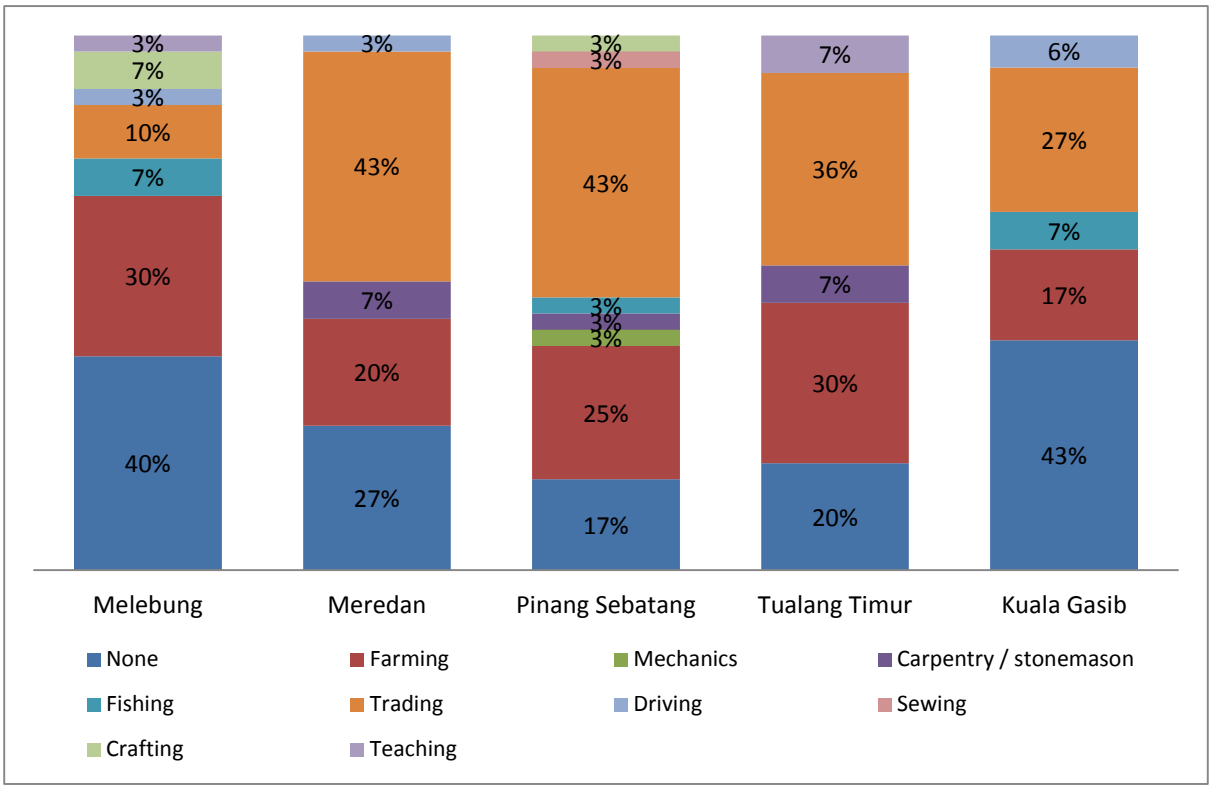

Figure 10-11 Graph of Respondent Household Side Livelihood Composition

By looking at the survey result on the human resources component, it can be concluded that the majority of respondents' households only rely on the main livelihood as a source of family income. Where the role of head of family majority of respondents become very dominant in sustaining the household economy. But this is not supported by the level of education and adequate skills, so that the type of work in the majority of respondents rely more on physical ability. And of course the income earned from the main livelihood is relatively small and just enough to meet daily basic needs only.

10.3 NATURAL RESOURCES

10.3.1 Respondents' Land Ownership

In **Figure 10-12** it is known that the majority of respondents in the four study location villages have no land, ie in Melebung, Meredan, Pinang Sebatang and Tualang Timur Villages. The composition of most respondents who do not have land is in the Melebung Village which is 83% of respondents. While in the village of Kuala Gasib the majority of respondents are landowners (59% of total respondents), with varying land ranges from 400 m2 to 10 Ha. Most of the land owner respondents generally have a land area ranging from 0-2 ha, others have a large area of land up to more than 6 ha and even respondents in the Tualang Timur Village has an area of 40 Ha. These lands are generally planted with rubber and palm oil, only a small proportion of respondents in Melebung Village who grow crops or horticulture and that is not widespread.

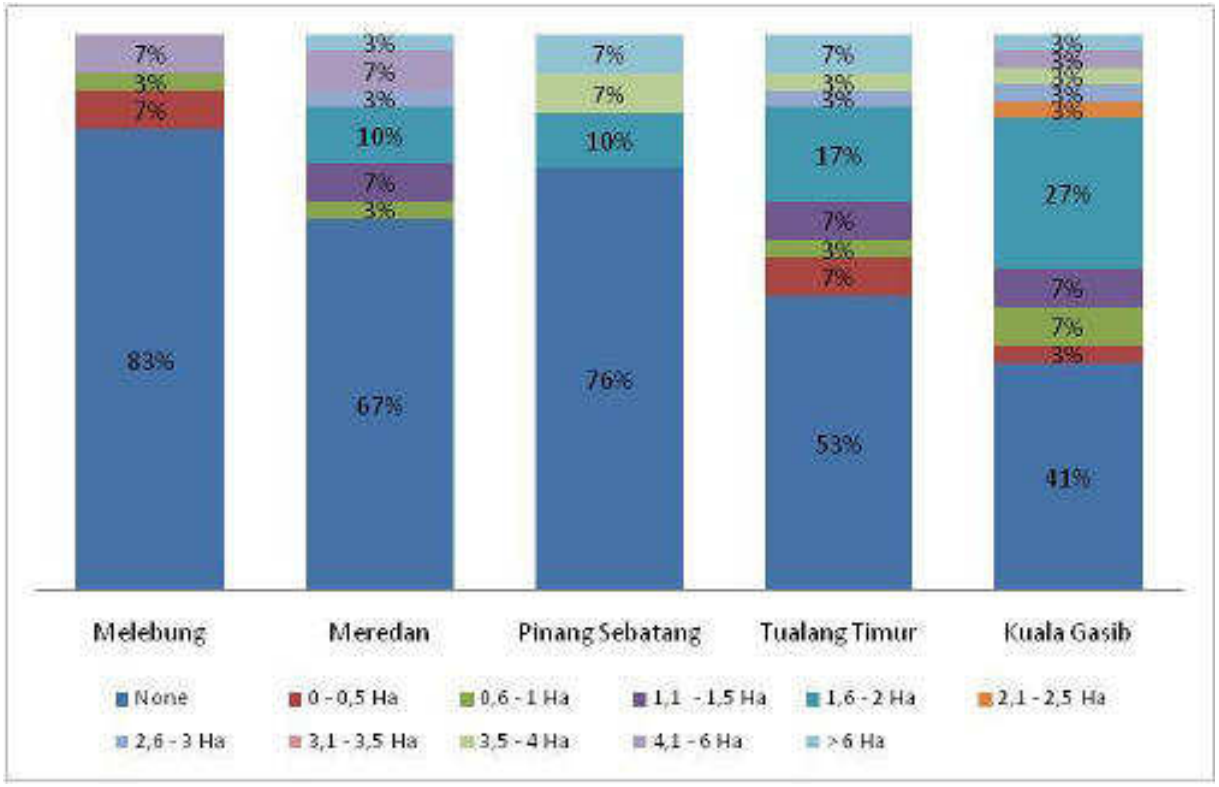

Figure 10-12 Graph of Respondent's Household's Land Area Composition

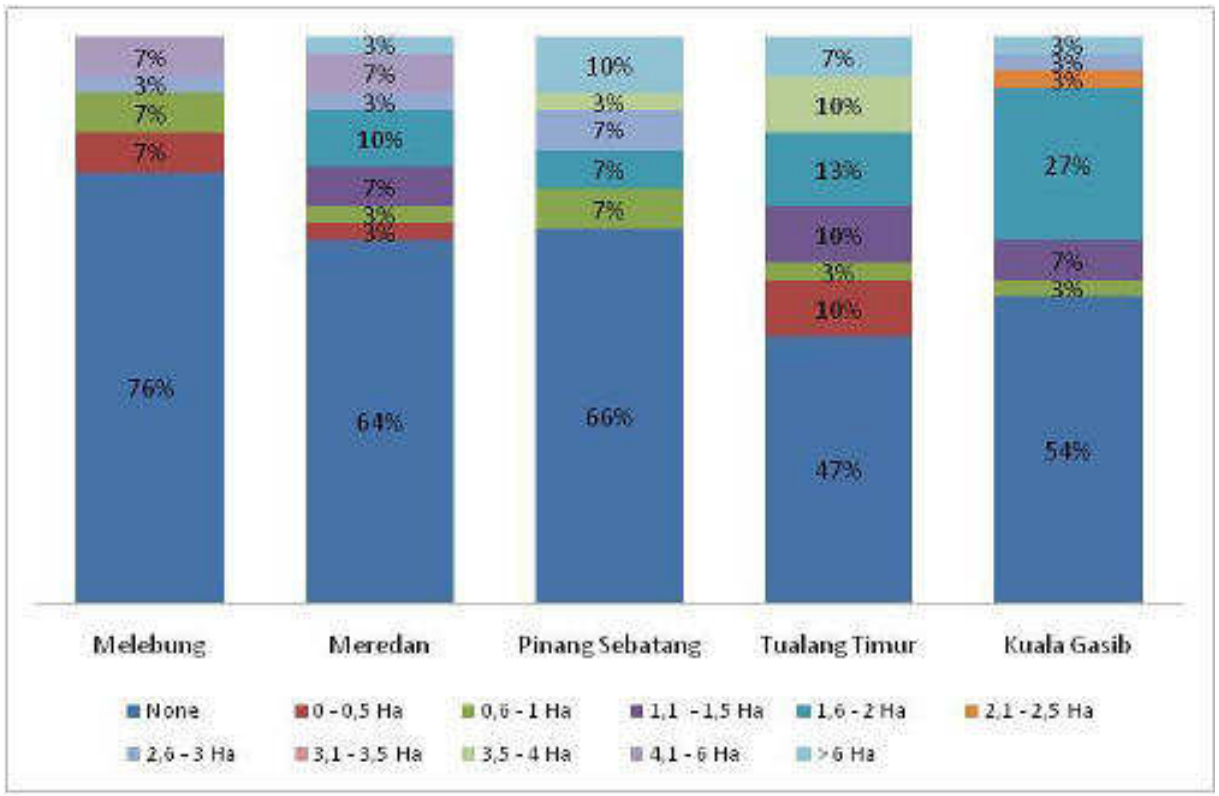

Figure 10-13 Graph of Respondent's Household's Worked Land Area Composition

Furthermore, the survey also recorded the area of respondent's land as shown in Figure 10-13. The majority of respondents in four study location villages (Melebung, Meredan, Pinang Sebatang and Kuala Gasib Villages) have no land. While in Tualang Timur Village the majority of respondents own cultivated land, ie by 53% of respondents. Generally, the area of respondent's land is related to the area of land owned. Some respondents who do not own land, work on land owned by parents or family land and there are also respondents who work on land owned by other people with rental system or just free stay . The status of respondent's land can be seen in the following table:

Table 10-1 Respondent Composition Based on Cultivated Land Status

Cultivated Land Status	Melebung	Meredan	Pinang Sebatang	Tualang Timur	Kuala Gasib
1. No land cultivating	76%	64%	66%	47%	54%
2. Individually owned	15%	33%	21%	40%	33%
3. Parents-owned		3%		3%	
4. Family- owned	3%		3%		
5. Rental			7%	7%	
6. Free stay	3%		3%	3%	13%
7. Company owned	3%				
	100%	**100%**	**100%**	**100%**	**100%**

Source : Prime data, 2018

Another phenomenon can be seen is the differences in general trends in the Village of Kuala Gasib. Where composition of respondents who do not work the land become the majority of respondents (54% of respondents), while according to land ownership data shows that the majority of respondents are land owners (59% of respondents).

This can be explained by looking at the table above, where from a total of 59% of respondents land owners were only 33% of respondents who work on their own land. Thus there are 26% of landowners who do not cultivate the land, where 13% of land area among them worked by respondents who do not have land by free staying. While 13% of other land area is not recorded in this survey, there is a possibility that the land is sleeping land or worked by others with rental system or other.

10.3.2 Respondent's Income from Nature

10.3.2.1 Respondent's Income from Agriculture and Garden Commodities

Based on the survey results, it can be seen that the respondent's income from agriculture and garden products, as shown in the following table:

Table 10-2 Respondents' Income Composition from Agricultural and Plantation Commodities

Commodity Type	Village	Percentage of Respondents	Luas Lahan	Hasil Panen Per Bulan	Harga Jual Per Kg
A. Rubber	Melebung	13%	1 – 5 Ha	90 – 500 Kg	Rp 5.000 – Rp 6.000
	Meredan	10%	1 – 4 Ha	250 – 350 Kg	Rp 7.500
	Pinang Sebatang	3%	0,5 Ha	50 Kg	Rp 6.000
	Tualang Timur	13%	0,25 – 4 Ha	150 – 1.000 Kg	Rp 6.000
	Kuala Gasib	10%	1 Ha	100 – 150 Kg	Rp 6.000
B. Palm	Melebung	10%	0,5 - 6 Ha	100 – 7.000 Kg	Rp 1.400 – Rp 1.600
	Meredan	27%	0,5 - 6 Ha	300 – 10.000 Kg	Rp 1.500
	Pinang Sebatang	27%	1 – 14,5 Ha	800 – 10.000 Kg	Rp 1.300 – Rp 1.750
	Tualang Timur	27%	1 – 40 Ha	200 – 80.000 Kg	Rp 1.300 – Rp 1.500
	Kuala Gasib	57%	1 – 10 Ha	200 – 40.000 Kg	Rp 1.000 – Rp 1.600
C. Seasonal crops & Horticulture	Melebung	3%	0,5 Ha	NA	Rp 5.000 - Rp 25.000

Source : Prime Data, 2018

According to the data, in Melebung Village there are 13% of respondents who get the results of rubber commodities, 10% of respondents get the results of palm oil and 3% of other respondents from the crops or horticulture. Whereas in the other four villages, the majority of respondents have income from oil palm and most are in the village of Kuala Gasib, which is 57% of respondents. It is interesting that the total composition of respondents in the village of Kuala Gasib which has income from oil palm exceeds the number of respondents who worked on the land, ie by 54% of respondents. Means there are 3% of respondents who do not work on the garden but get the results of oil palm. This phenomenon can be explained, that many people also enjoy the results by picking up the rest of the harvest of palm that is not taken by the owner of the garden or tiller. They collect the rest of the oil palm harvest on the permit of the owner of the garden or the cultivators after the harvest transport is completed.

Some of the other respondents in the four villages have revenues from rubber and none of the respondents in this region have income from crops or horticulture. This is because the land in this region is not suitable for cultivation of crops and horticulture species, generally is peat soil with high acidity level.

Revenue from each commodity can be calculated based on the data in the table above. Total respondents' income from rubber with a minimum selling price of Rp 5.000 / Kg is located in Melebung Village, which ranges between Rp 450,000 - Rp 2,500,000 per month in accordance with the number of crops per month and the area of cultivated land. And total revenue with a maximum selling price of Rp 7,500 / Kg is in Meredan Village, ranging from Rp 1.875.000 - Rp 2.625.000 per month.

For palm oil, respondents have a minimum income of Rp 140,000 - Rp 450,000 per month and a maximum of Rp 64,000,000 - Rp 104 million per month. The more land that is cultivated the greater the number of crops, and of course the greater the income. Generally oil palm plantations can be economically profitable if the land cultivated is a minimum of 2 Ha. The cheapest selling price of oil palm is found in the village of Kuala Gasib, which is Rp 1,000 / Kg.

In the case of selling rubber and palm commodities, it is usually sold to chinese ethnic businessman (tauke) or collectors in each village. None of the respondents brought their crops and sold them in the city. They sell rubber or oil palm in the garden or take it to a tauke shelter in the village.

The total income of respondents from the crops and horticulture commodities in Melebung Village can not be known for certain because the respondent can not predict the harvest every month. The reason is because the commodities planted are various types with different harvest periods. The results obtained are also erratic because it is not intensive, sometimes it does not produce at all. Some commodities grown such as sweet potatoes, corn, peanuts, long beans, kale, tomatoes, chili, banana or other. Only price information is known, which ranges from Rp 5,000 - Rp 25,000 per kg, depending on the type of commodity. And the agricultural produce is only sold to neighbors and for household consumption.

10.3.2.2 Revenue from Animal Farming and Fisheries

The composition of respondents' income from livestock products in each village can be seen in the following table:

Table 10-3 Respondents' Revenue Composition from Animal Farming

Animal Types	Village	Percentage of Respondents	Number	Production Number per Years	Selling Price
a. Goats	Meredan	13%	5 – 9	NA	Rp 1.500.000 – Rp 2.000.000
	Pinang Sebatang	3%	2	2	Rp 1.500.000
b. Chicken	Melebung	23%	2 – 40	NA	Rp 30.000 – Rp 40.000
	Meredan	20%	2 – 30	NA	Rp 35.000
	Pinang Sebatang	40%	1 – 30	NA	Rp 20.000 – Rp 50.000
	Tualang Timur	43%	3 – 20	20	Rp 45.000 – Rp 50.000
	Kuala Gasib	50%	5 – 20	NA	Rp 50.000
c. Duck	Melebung	3%	15	NA	Rp 50.000
	Pinang Sebatang	27%	5 – 10	NA	NA

Respondents who rear goats are found in Meredan and Pinang Sebatang villages. There is a difference from the respondents of goat breeders in both villages, for breeders in Meredan Village generally goat breeding as family saving and only sideline. They sell their goats when there is an urgent need and are not sold every year. So their goats will multiply and grow every year. While goat farmers in the village of Pinang Sebatang, raising goats as an additional source of income for the family. Where they buy saplings to be raised that will then be sold when the size is large enough. In one year at least one time to sell goats, with a minimum number of 2 goats per year. So the minimum amount of revenue is Rp 3,000,000 per year. Generally these goat farmers sell goats to local markets or to livestock collectors.

Other livestock is chicken, the generally farmed is yard rear chicken type and small scale by exploiting home garden yard. In the five study villages, there were respondents who raise

chickens with a large composition in Pinang Sebatang, Tualang Timur and Kuala Gasib Village. In these three villages some of the respondents raising chickens, ie by 40% - 50% of respondents. The number of small-scale chicken livestock ranges from 1 - 40 chickens. Only respondents in Tualang Timur Village raising chickens for additional family income, where in each year can sell a maximum of 20 chickens. The amount of income earned from the sale of chicken is Rp 900,000 - Rp 1,000,000 per year. They sell their poultry to the local market or to the cattle-raiser. Meanwhile most of the respondents of chicken breeders in four other villages, generally are only for the sideline income and for own consumption. They will sell their chickens when there is an urgent need and only sold to neighbors.

In addition to goats and chickens, there are a small proportion of respondents in Melebung Village and there are quite a lot of respondents in Pinang Sebatang Village who raise ducks. These ducks are generally also only for sideline income and for their own consumption. They will sell the ducks when there is an urgent need and are only sold to neighbors.

For fishery commodities, none of the respondents who claimed to have income from the fishery sub-sector either aquaculture or capture fisheries. As for respondents who have livelihoods of fishing, do not state that fisheries are not included in their sources of income. They do these activities only occasionally at leisure and are not a routine activity. The result is not much and usually for own consumption or sold to neighbors. In terms of pond and aquaculture cultivation is very difficult to develop because in five study locations villages fresh water availability is very limited.

By looking at the survey results of natural resource components, it can be concluded that the majority of respondents' households do not depend their income on natural products. The factors that influence it are the limitation of the carrying capacity of the natural resources themselves, such as limited land, lack of water availability and soil fertility.

Most of the respondents who get the results from nature are landowners, where the main commodities are rubber and oil palm. As for respondents who do not own land, only a small proportion have income from agriculture or plantations on their land. However, the majority of the people who do not have land in the study location indirectly also enjoy the results of rubber and oil palm plantation sub-sector, working as laborers in the garden. As for livestock, the majority of respondents have not been intensively involved as a source of income.

10.4 PHYSICAL RESOURCES

10.4.1 Respondent's House Condition

10.4.1.1 House Ownership Status

In **Table 10-4**, it can be seen that in Melebung Village there are 70% of respondents who have owning their house and 13% of respondents are still free stayers. Then there are as many as 10% of respondents whose homes are still owned by parents and 7% of respondents whose homes are official houses. Furthermore, for Meredan Village, it is known that there are as many as 73% of respondents whose homes are self-owned and as many as 10% of respondents whose homes are owned by parents. Then as many as 10% of respondents home is a home office and 7% of respondents home is leasing.

As for Pinang Sebatang Village it is known that there are as many as 57% of respondents whose homes are self-owned and as many as 23% of respondents whose homes are still contracting. Then as many as 17% of respondents whose homes are still free staying and 3% of respondents whose homes still belong to parents. Furthermore, for the Village of Tualang Timur, it is known that as many as 90% of respondents have their own homes and as many as 7% of respondents whose homes still belong to parents. Only 3% of respondents whose homes are contracts. Finally, for the Village of Kuala Gasib, there are as many as 74% of respondents whose homes are self-owned and there are 13% of respondents whose homes are contracts. Then there are as many as 10% of respondents whose homes are the property of parents and 3% of respondents whose homes are free staying.

Table 10-4 Composition of Respondent House Ownership Status

Home Status	Melebung	Meredan	Pinang Sebatang	Tualang Timur	Kuala Gasib
1. Individually owned	70%	73%	57%	90%	74%
2. Parents-owned	10%	10%	3%	7%	10%
3. Leasing		7%	23%	3%	13%
4. Free stay	13%		17%		3%
5. Official Residence	7%	10%			
	100%	**100%**	**100%**	**100%**	**100%**

Source : Prime data, 2018

10.4.1.2 Land and Building Area

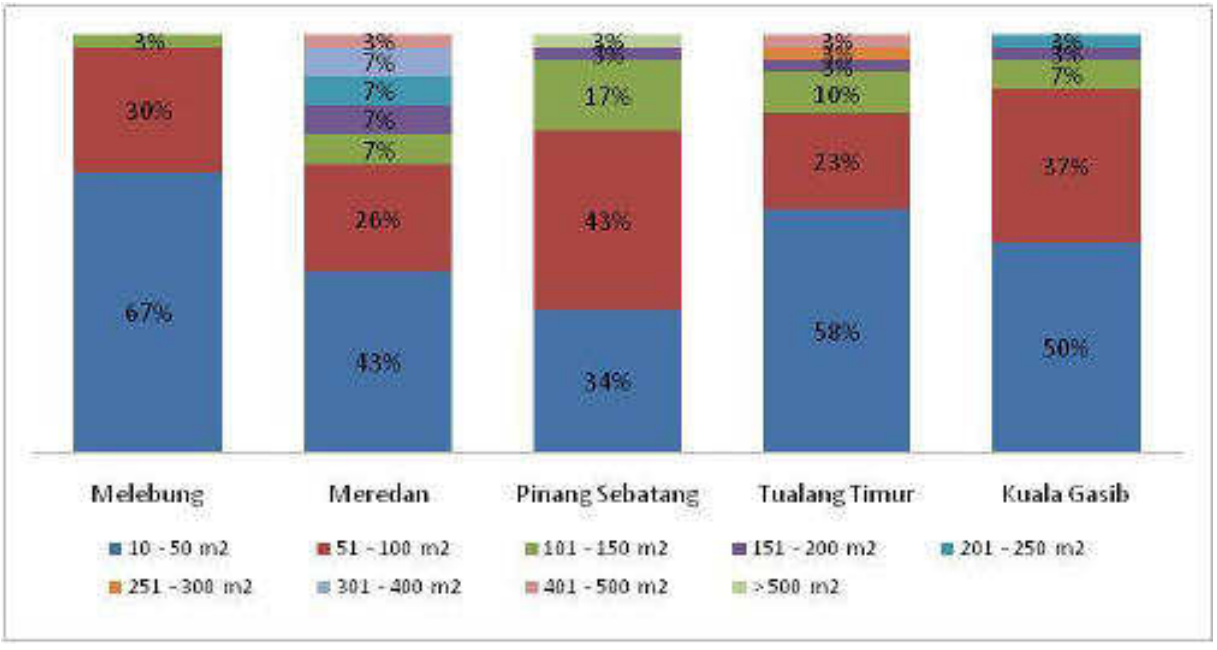

Figure 10-14 Graph of Respondent's House Building Area

In the above graph, it can be seen that the majority of respondents in the five study location villages have a house building area under or equal to 100 m2. With the largest composition

of the building area of 10 - 50 m2. Furthermore, for the composition of respondent's land area can be seen in the following graph:

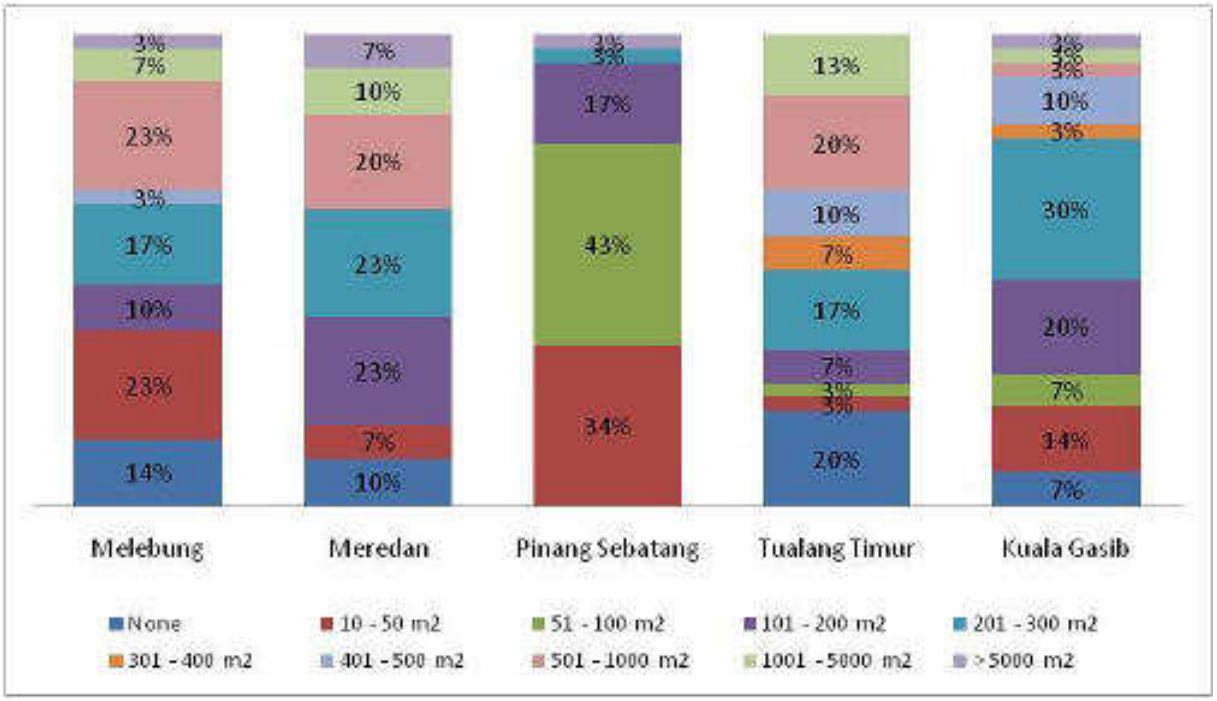

Figure 10-15 Graph of Respondent's House Land Area Composition

If you look at the graph above, in Melebung, Meredan, Pinang Sebatang and Kuala Gasib Villages there are some respondents who do not have land of their house. While most of the respondents who own land of their homes have the largest composition of respondents in different land area in each village and there is no similar trend.

As in the Village Melebung there are two groups of house land area with the composition of respondents are quite a lot, ie on land area of 10 - 50 m2 and 501 - 1,000 m2, respectively by 23% of respondents and this composition is different from other villages. Another example in Pinang Sebatang village the composition of respondents is quite significant where 43% of respondents have the land area of the house in the group 51 - 100 m2 and 34% of other respondents in the group of 10 - 50 m2.

10.4.1.3 House Building Condition

If we look at the housing condition data of respondents in Table 10-5, it can be seen that the majority of respondents in five study location villages have permanent houses. The majority of respondent's house building uses roof with zinc material, brick wall or board and cement floor. In fact, there are quite a lot of respondents whose house is tiled as floor in Meredan, Pinang Sebatang, Tualang Timur and Kuala Gasib Village.Nevertheless, 7% of respondents in Melebung Village have buildings with sago palm roofs, then 3% of respondents in the village of Kuala Gasib whose house is still dirt as floor.

Table 10-5 Respondent's House Building Conditon

Building	Material	Melebung	Meredan	Pinang Sebatang	Tualang Timur	Kuala Gasib
Roof	Zinc	93%	87%	97%	93%	83%
	Tile		10%	3%		3%

	Sago palm	7%				
	Asbestos		3%		7%	14%
	Total	**100%**	**100%**	**100%**	**100%**	**100%**
Wall	Brick	43%	50%	53%	50%	37%
	Plank	57%	50%	47%	50%	63%
	Plywood					
	Total	**100%**	**100%**	**100%**	**100%**	**100%**
Floor	Ceramic	7%	23%	20%	23%	17%
	Cement	76%	70%	77%	67%	70%
	Board	17%	7%	3%	10%	10%
	Dirt					3%
	Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source : Prime data, 2018

In addition, based on the survey results also known that as many as 65% of respondents stated that the source of home construction comes from personal funds and as many as 9% of respondents build their houses with the help of funds from other parties such as government, parents or family and company. Another 23% of respondents are contracted, rented or boarded.

In general, the houses of respondents in the five study villages were built between 2007 and 2016. And many respondents occupy houses built between 1990 and 1998. The Bathing, Washing, and toilet facilities are generally built in conjunction with the construction of houses.

Based on observations in the fiel, it can be seen that the condition of air circulation on the majority of respondents home by 95% while the remaining 5% of respondents homes do not have air circulation. Then it is also known that 56% of respondent's house has good lighting conditions. There were 33% of respondents 'houses with moderate lighting conditions and 11% of respondents' houses with poor home lighting conditions.

Table 10-6 Respondent’s Lighting Source or Electricity Source

Lighting Source	Melebung	Meredan	Pinang Sebatang	Tualang Timur	Kuala Gasib
PLN	17%			4%	47%
Oil Lamp	3%	3%	3%		3%
Private generator set	23%	77%	77%	30%	40%
Village generator set	57%	3%		37%	3%
Joined family generator set		17%	7%	4%	7%
Diesel			13%	25%	
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source : Prime data, 2018

Based on the results of socio-economic survey conducted, it is known that the source of electricity in the majority of respondents' homes is by using a generator, whether it is a personally owned generator, belongs to the village or joining with the family's generator. PLN electricity source is mostly used by respondents in Kuala Gasib, while in Melebung only 17% of respondents and 4% of respondents in Tualang Timur.

In two other villages, namely Meredan and Pinang Sebatang there are no respondents who use electricity from PLN. This is because in the residential area which is where the location of the survey is there is no PLN electricity network availabe. There are even respondents who use oil lamps for lighting sources. This is in accordance with the results of observations and interviews related to infrastructure that get information that most of the study locations Villages have not been supplied with PLN electricity.

For drinking water facilities of respondents, the majority of respondents are using water refills for drinking purposes. This is because groundwater quality at the study sites generally does not meet health standards. However, in Tualang Timur, the majority of respondents still use well water for drinking purposes. And only a small percentage of respondents in Melebung and Meredan who have used PDAM (Drinking Water Company) facilities as household water source.

Table 10-7 Respondent's Drinking Water Facilities

Clean Water Source	Melebung	Meredan	Pinang Sebatang	Tualang Timur	Kuala Gasib
PDAM	3%	3%			
Water Well	50%	17%	21%	89%	27%
Water Refill	47%	80%	79%	11%	73%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source : Prime data, 2018

From observations and interviews there are also found that water quality at the study sites was very low and very difficult to obtain. This condition is caused by the land in the study location is peat land or rock soil. People living on the river banks are using river water for their household water needs. While people who are far from the river, get clean water from the well and for that they must use a deep drilled wells.

10.4.2 Other Physical Asset Ownership

10.4.2.1 Household Goods Ownership

In the table below it can be seen that for goods such as television, spring bed and gas stove is not a luxury for most respondents. The majority of respondents in the study location villages have the ability to purchase such items. As for other goods such as refrigerator, sofa and table then many respondents who already have it, but not all respondents are able to buy it or assume the goods are important to have.

Table 10-8 Composition of Respondent's Household Goods Ownership

Types of Goods	Melebung		Meredan		Pinang Sebatang		Tualang Timur		Kuala Gasib	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
A. Televisiion	90%	10%	87%	13%	90%	10%	93%	7%	90%	10%
B. Refrigerator	13%	87%	27%	73%	77%	23%	50%	50%	23%	77%
C. Spring Bed	63%	37%	63%	37%	83%	17%	90%	10%	83%	17%
D. Sofa	10%	90%	30%	70%	17%	83%	30%	70%	30%	70%
E. Dinning Table	7%	93%	23%	77%	20%	80%	27%	73%	27%	73%
F. Gas Stove	93%	7%	97%	3%	97%	3%	100%		97%	3%

Source : Prime data, 2018

10.4.2.2 Vehicle Ownership and Public Transportation Facility Usage

Table 10-9 Ownership Composition of Respondent Vehicles

Jenis Kendaraan	Melebung		Meredan		Pinang Sebatang		Tualang Timur		Kuala Gasib	
	ada	tidak	ada	tidak	ada	tidak	ada	Tidak	ada	Tidak
A. Bicycle	17%	73%	10%	90%	17%	83%	27%	73%	17%	83%
B. Motor Cycle	87%	13%	97%	7%	93%	7%	93%	7%	100%	
C. Car	7%	93%	16%	84%	10%	90%	10%	90%	23%	77%
D.Truck		100%	3%	97%	3%	97%	10%	90%	3%	97%
E. Boats	3%	97%		100%		100%		100%	3%	97%

Source : Prime data, 2018

Based on the results of household socio-economic survey, the majority of respondents in the study location villages have at least one motorcycle vehicle. This motorcycle vehicle becomes the main means of transportation of citizens at the study site. As for the type of bicycle vehicle is also quite a lot of respondents who have it. Then for car vehicles, there are quite a lot of respondents in Kuala Gasib and Meredan who own it.

For respondents who own trading businesses and large oil palm plantations are also identified as having trucking vehicles, with the largest composition of respondents in Tualang Timur. There are also a small number of respondents in Melebung and Kuala Gasib who own boats as a means of transportation.

10.4.3 Business Building Owned

Table 10-10 Composition of Respondent's Business Building

Type of Designation	Kelurahan	Persentase Responden	Building Status	Ownership Status
A.Stall	Melebung	10%	3% permanen 7 % semi permanen	milik sendiri
	Meredan	33%	13% permanen 20% semi permanen	30% milik sendiri 3% milik bersama
	Pinang Sebatang	33%	10% permanen 23% semi permanen	30% milik sendiri 3% milik bersama
	Tualang Timur	33%	16% permanen 17% semi permanen	30% milik sendiri 3% milik bersama
	Kuala Gasib	20%	3% permanen 17% semi permanen	17% milik sendiri 3% milik bersama
B.Store	Melebung	0	0	0
	Meredan	3%	permanen	Milik sendiri
	Pinang Sebatang	10%	permanen	7% milik sendiri 3% milik bersama
	Tualang Timur	0	0	0
	Kuala Gasib	10%	permanen	7% milik sendiri 3% milik bersama

Source : Prime data, 2018

Based on the result of household socio-economic survey, it is known that in Meredan, Pinang Sebatang, Tualang Timur and Kuala Gasib, there are quite a lot of respondents owning small store building. Generally the ownership status of their stalls is self-owned and usually the building is adjacent with the building of the house or are in their home yard. The trading business in a stall is generally a family side livelihood managed by a wife.

While in Melebung not too many respondents have a stall, only 10% of respondents and none of the respondents owned the store building. The shops are owned by a number of respondents in Meredan, Tualang Timur and Kuala Gasib. Generally those who run businesses in this store, are respondents who have a major livelihood as a trader.

10.5 FINANCE RESOURCES

10.5.1 Household Revenue

10.5.1.1 Revenue from Trading

The majority of respondents who own a business trade are in the income group of Rp 501,000 - Rp 1,000,000 per month and income group 1,001,000 - Rp 3,000,000 per month. Some other respondents have income from trading businesses in the range of Rp 100,000 - Rp 500,000 per month. Generally the trading business that is run on these three income groups, is a small-scale trading business like home-based shop.

As for medium and large scale business, only a small percentage of respondents are in the income group of Rp 20,000,000 - Rp 60,000,000 per month and income groups above Rp 60,000. per month.

Table 10-11 Respondent Percentage that Receive Income from Trading

Trading Income	Melebung	Meredan	Pinang Sebatang	Tualang Timur	Kuala Gasib
Rp 100.00 - Rp 500.000		10%		10%	6,7%
Rp 501.000 - Rp 1.000.000	3,3%	13,4%	6,7%		23,3%
Rp 1.001.000 - Rp 3.000.000	6,7%	13,3%	13,4%	33%	
Rp 3.001.000 - Rp 6.000.000		3,3%	6,6%	3,3%	
Rp 20.000.000 - 60.000.000			6,7%		
> Rp 60.000.000		3,3%	3,3%		
Tidak Ada	90%	56,7%	63,3%	53,4%	70%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source : Prime data, 2018

10.5.1.2 Revenue from Salary

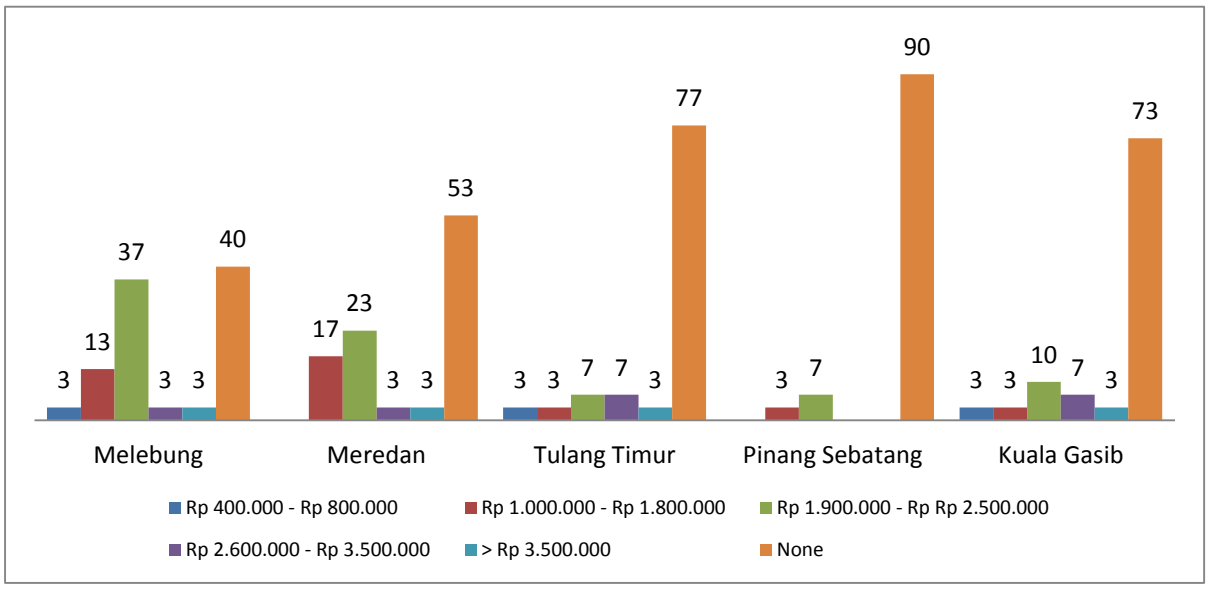

Figure 10-16 Respondent Percentage that Receive Income from Salary

The majority of respondents who have income from salary are in the income group Rp 1,900,000 - Rp 2,500,000 per month. And most respondents who have income from salary is in Melebung and Meredan. Generally they work in the informal sector such as plantation workers or honorarium workers.

10.5.1.3 Submisson from Family

Based on the results of household socio-economic survey it can be seen that only a few respondents who received money from the family. The composition of respondents who received money from the family can be seen in the following graph:

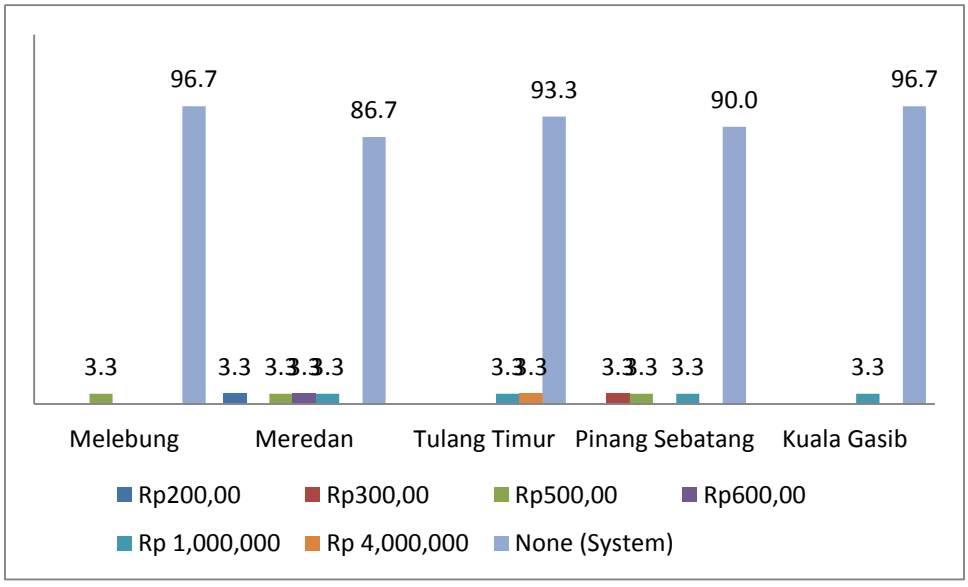

Figure 10-17 Respondent Percentage that Receive Money from Family

10.5.1.4 Retiree

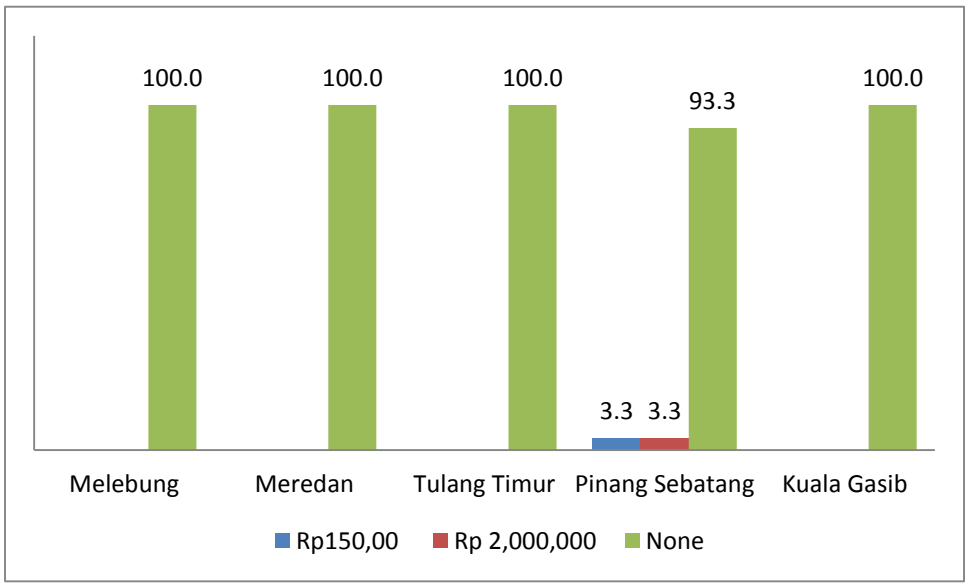

Figure 10-18 Respondent Percentage that Receive Pension

Based on the result of household socio-economic survey it can be seen that there are only 6.6% of respondents who have a pension in Pinang Sebatang with a large pension is Rp 150,000 per month and Rp 2,000,000 per month.

10.5.1.5 Other Income

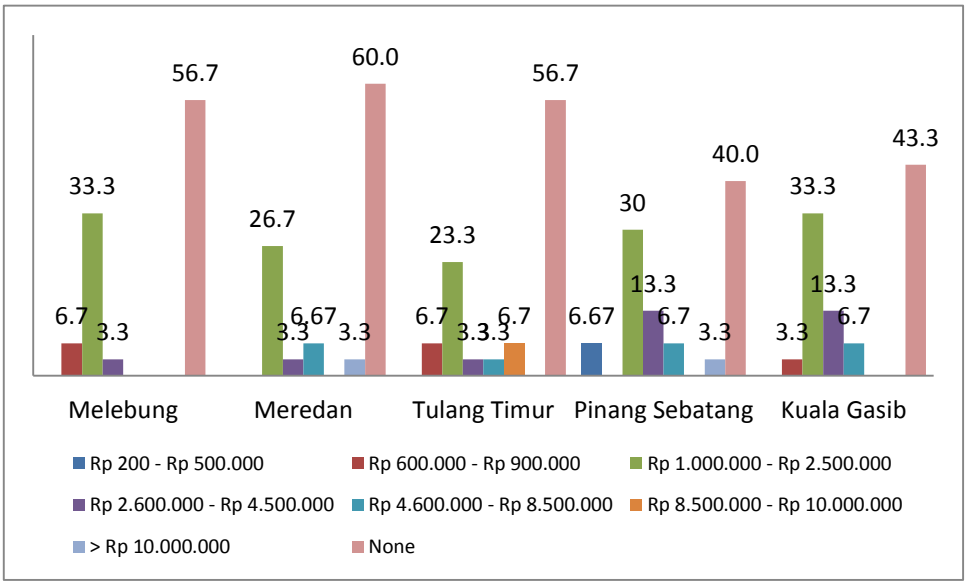

Figure 10-19 Respondent Percentage that Have Income from Other Resources

Based on the results of household socioe-conomic survey, it can be seen that there are only 6.6% of respondents who have a pension in Pinang Sebatang with a large pension is Rp 150,000 per month and Rp 2.000.000 per month. On the graph above it can be seen that the majority of respondents who have income from other sources are in the income group of Rp 1,000,000 - Rp 2,500,000 per month. Especially in Pinang Sebatang and Kuala Gasib there are quite a lot of respondents who have income from other sources in the income group of Rp 2,600,000 - Rp 4,500,000 per month. There is also a small percentage of

respondents of 3.3% of respondents in Tualang imur who have income from other sources in the range of Rp 4,600,000 - Rp 8,500,000 per month and 3.3% respondents in Kuala Gasib have income from other sources more than Rp 10,000,000 per month.

Other sources of income include agriculture, plantation and animal farming. In addition, from other income in the informal sector such as day laborers drivers, workshops, carpentry and others.

10.5.2 Average Household Revenue

Table 10-12 Respondent's Average Household Revenue Per Month

Income	Melebung	Meredan	Pinang Sebatang	Tualang Timur	Kuala Gasib
< Rp 500.000		10%		3,3%	
Rp 500.000 - Rp 1.000.000	3,3%		10%	3,3%	10%
Rp 1.000.000 - Rp 2.500.000	80,0%	60%	40%	53,3%	50%
Rp 2.500.000 - Rp 5.000.000	10,0%	20%	33%	33,3%	30%
Rp 5.000.000 - Rp 10.000.000	6,7%	6,7%	10%	3,3%	10%
> Rp 10.000.000		3,3%	7%	3,3%	
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source : Prime data, 2018

In the table above, it can be seen that the largest composition of respondents are in the average group income of Rp 1,000,000 - Rp 2,500,000 per month and Rp 2,500,000 - Rp 5,000,000 per month. The concern is that 10% of respondents in Meredan and 3.3% of respondents in Tualang Timur have an average income of less than Rp 500,000 per month. Both groups of these respondents are economically included in vulnerable groups and poor families, but the clarity will be analyzed in depth in the next discussion about vulnerable groups and family economic level.

10.5.3 Average Household Expenditures

In the following table it can be seen that the average household expenditure of respondents in each village study location

Table 10-13 Avearge Respondent's Household Expenditures Per Month

Expense	Melebung	Meredan	Pinang Sebatang	Tualang Timur	Kuala Gasib
Rp 500.000 - Rp .700.000		3,3%	3,3%	6,7%	6,6%
Rp 750.000 - Rp 1.000.000	13,3%	6,4%	10%		16,7%
Rp 1.100.000 - Rp 2.000.000	50,0%	36,7%	36,7%	36,7%	16,7%
Rp 2.100.000 - Rp 3.000.000	23,3%	30,0%	13,3%	26,7%	36,7%
Rp 3.100.000 - Rp 4.000.000		10,0%	16,7%	13,3%	10%
Rp 4.100.000 - Rp 6.000.000	6,6%		6,6%	3,3%	10%
Rp 6.100.000 - Rp 10.000.000	3,3%	6,7%	6,6%	3,3%	3,3%
> Rp 10.000.000		3,3%	3,3%		
None	3,3%	3,3%	6,7%	10%	

Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source : Prime data, 2018

The largest composition of respondents is in the average expenditure group of Rp 1,100,000 - Rp 2,000,000 per month and Rp 2,100,000 - Rp 3,000,000 per month. This composition is almost comparable to the average composition of respondents' income per month, where respondents who have an average income of Rp 1,000,000 to Rp 2,500,000 per month generally have an average expenditure of Rp 1,100,000 - Rp 2,000,000 per month . While respondents who have an average income of Rp 2.500.000 - Rp 5,000,000 per month, generally have an average expenditure of Rp 2,100,000 - Rp 3,000,000 per month.

If you look at the data it can be assumed that the majority of respondents have an average income that is just enough to meet basic needs only. They generally have no savings from their income.

Based on the results of household survey, it can be identified that the largest group of respondents and expenditure types as shown in the following table:

Table 10-14 Biggest Expenditures Group and Respondent's Expenditures Type

Expenditures	Expense group	Respondent's percentage
Expense for Rice	Rp 200.000 - Rp 600.000	82,0
Expense for Communication	Rp 10.000 - Rp 100.000	66,7
Expense for Side dish and vegetables	Rp 200.000 - Rp 600.000	50,7
Expense for Electricity	Rp 200.000 - Rp 600.000	50,0
Expense for Transportation	Rp 100.000 - Rp 300.000	48,0
Expense for Cigarette	Rp 200.000 - Rp 600.000	38,7
Expense for Education	Rp 150.000 - Rp 500.000	33,3
Expense for Health	None	82
Expense for Other	None	90
Expense for Recreation	None	98

Source : Prime data, 2018

10.6 HOUSEHOLD ECONOMY

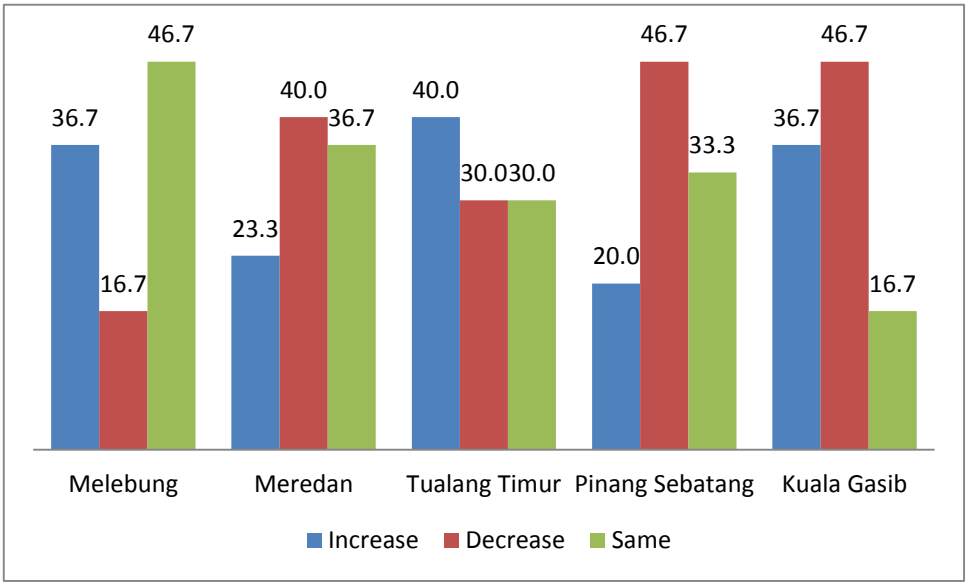

Figure 10-20 Household Economy Condition According to Respondent

According to the majority of respondents in Meredan, Pinang Sebatang and Kuala Gasib that their economic condition has decreased compared to previous years. While the majority of respondents in Melebung stated that the economic conditions of their households are the same as in previous years. Only in Tualang Timur where the majority of respondents stated that there are economic improvement.

Some of the respondent's dominant reasons who declared that the decline in economic conditions are due to the declining of their oil palm plantations yields, the price of oil palm and rubber, the difficulty of getting a job and the price of basic necessities are getting higher. While the dominant reasons of respondents who experienced an increase in the economy were increasing oil palm prices, increasing yields of oil palm plantations and wage increases.

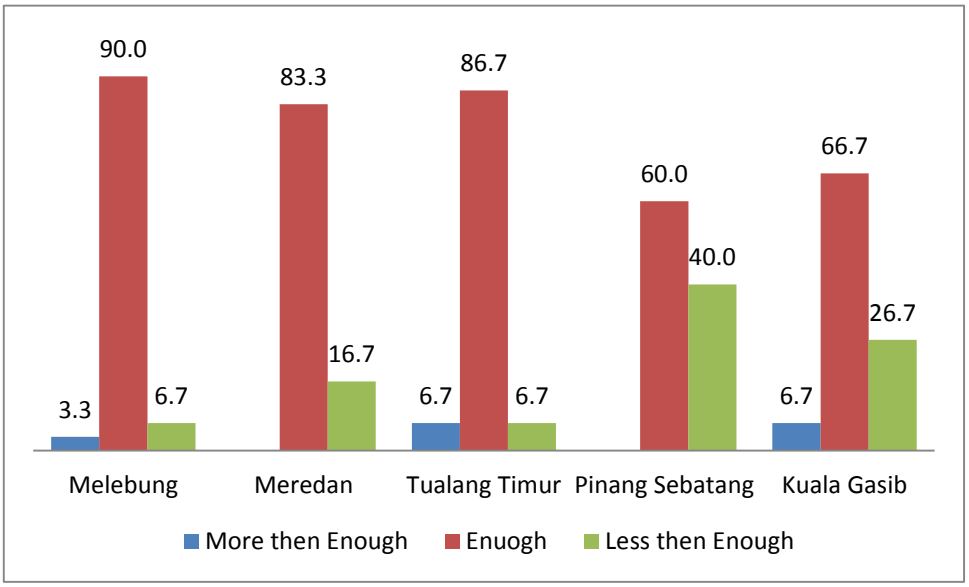

Figure 10-21 Adequacy of Revenue According to Respondents

In the graph above, it shows that the majority of respondents stated adequate with the average income they have and the economic conditions they face. However, there are still many respondents who stated insufficient for their current income.

Related to the bank account ownership, the majority of respondents in Melebung, Meredan, Tualang Timur and Pinang Sebatang stated they do not have bank accounts. While the majority of respondents in Kuala Gasib states they have a bank account. And there are a number of respondents who did not give an answer.

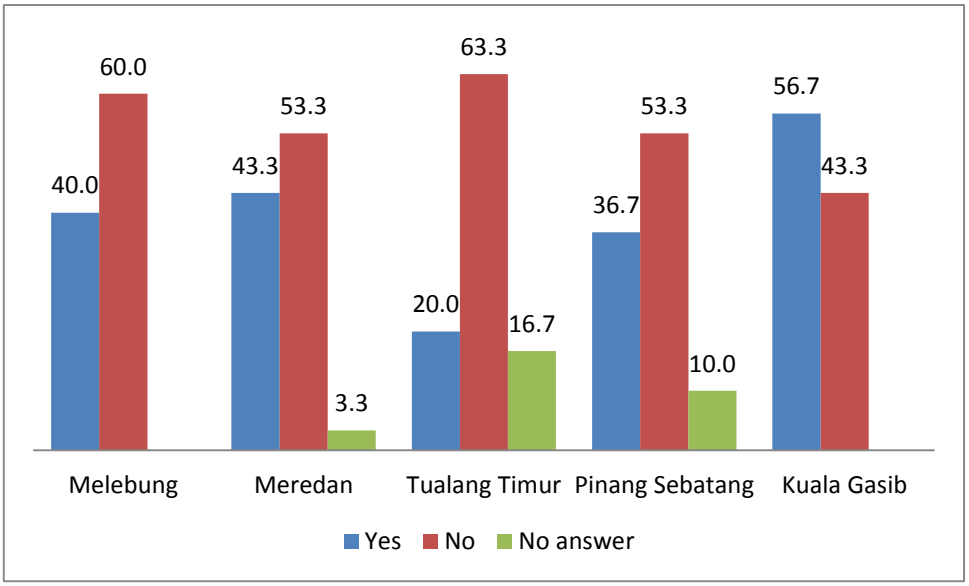

Figure 10-22 Ownership of Respondent's Bank Account

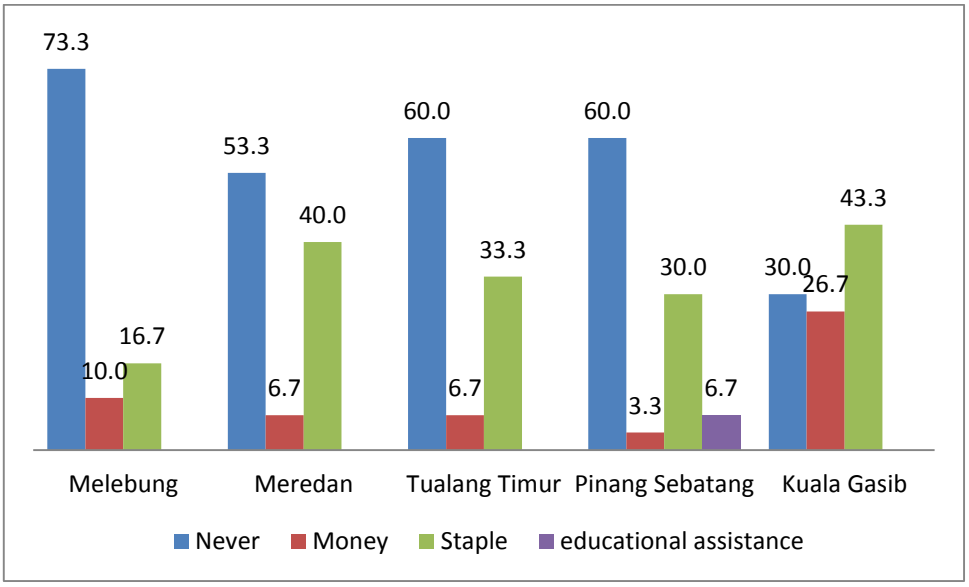

Figure 10-23 Form of Assistance Ever Received by Respondents

The household socio-economic survey can also identify the forms of assistance that respondents have received, as shown in the graph above. The majority of respondents said they never received help. The majority of respondents who claimed to have received assistance were in the form of assistance of nine basic commodities (sembako).

Meanwhile, if in urgent circumstances the majority of respondents will borrow to neighbors or families, and generally they are forced to borrow if pressed for daily needs. For the purposes of venture capital, they usually borrow to the Cooperative, Bank or Tauke.

10.7 SOCIAL RESOURCES

10.7.1 Respondent's Community Life

10.7.1.1 Mutual Assistance Activities in Respondents' Environment

The mutual assistance activity in the respondent's environment according to the household socio-economic survey results can be identified that the majority of respondents stated there is rarely any gotog royong activities in their neighborhood. While some respondents stated that there is no implementation mutual assistance in their environment.

More clearly the composition of respondents about the implementation of mutual assistance activities in the environment of respondents can be seen in Figure 10-24 below

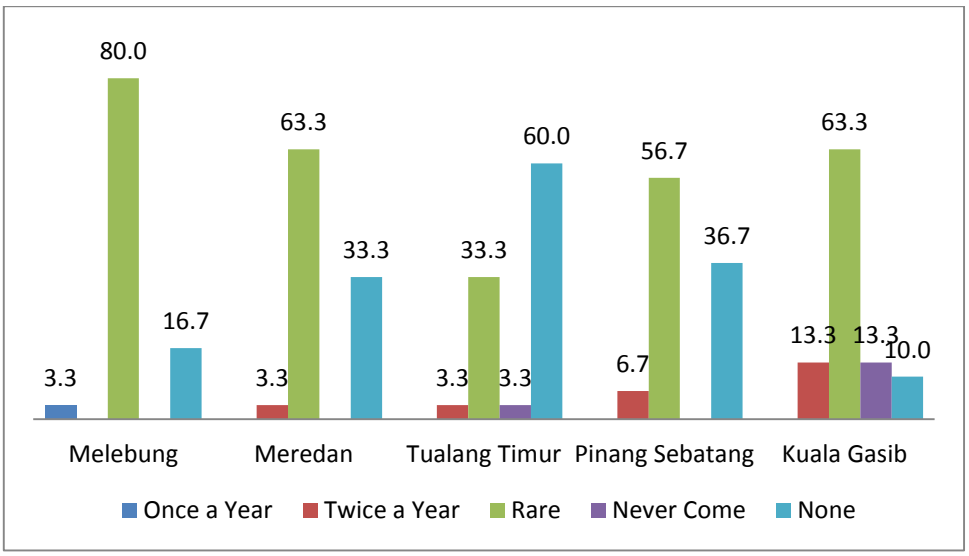

Figure 10-24 Pelaksanaan Gotong Royong di Lingkungan Responden

10.7.1.2 Social Activities in Respondent's Environment

Table 10-15 Type of Social Activities Foolowed by Respondent

Social Activities	Melebung	Meredan	Pinang Sebatang	Tualang Timur	Kuala Gasib
Arisan (social gathering)	83%	53%	77%	50%	77%
National Day Celebration	93%	87%	90%	83%	83%
Heath Post for Children	80%	87%	77%	90%	83%
Health Post for Elderly	17%	27%	40%	83%	57%
Learning Group of Al quran	93%	100%	93%	67%	90%

Religious Day Celebration	73%	80%	80%	77%	90%

Source : Prime data, 2018

For this type of social activity, the majority of respondents said to follow the activities of social gathering, National celebration of the day, Posyandu for toddlers, Quran recitation and celebration of religious holidays in their village. For the elderly Posyandu activity, the majority of respondents stated not available. There are four types of activities that have a large percentage, namely Quran recital activities, National celebration of the day, Posyandu for toddlers and the celebration of religious holidays.

10.7.1.3 Respondent's Involvement In Organization

Based on the results of household surveys it is known that the majority of respondents stated that they are not involved in organizational activities. While the respondents who are actively involved in the activities of the organization are stated that the majority of them are active in the study group or religious organization. A small number of other respondents are active in PKK, Karang Taruna or youth activities and professional groups such as farmer groups.

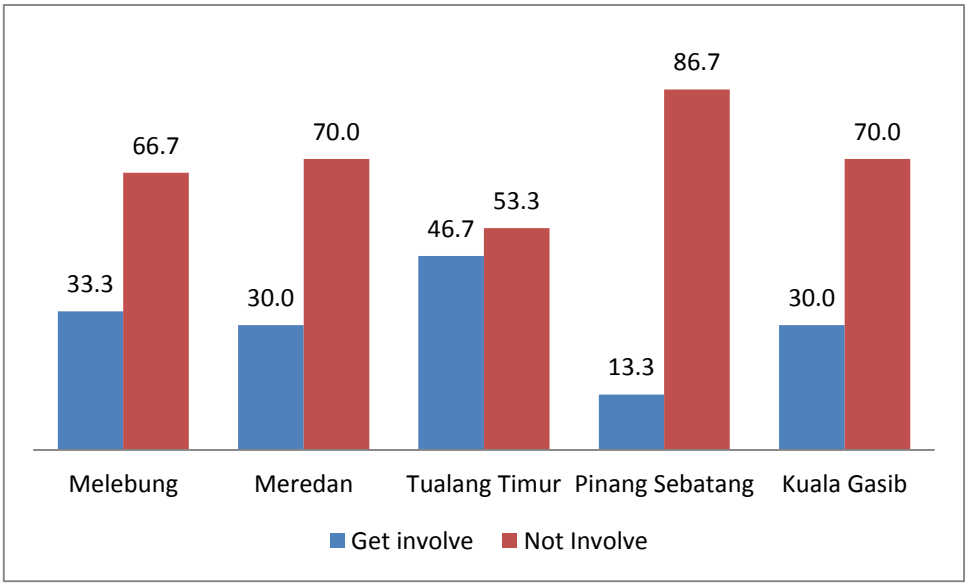

Figure 10-25 Graph of Respondents' Involvement in Organizations

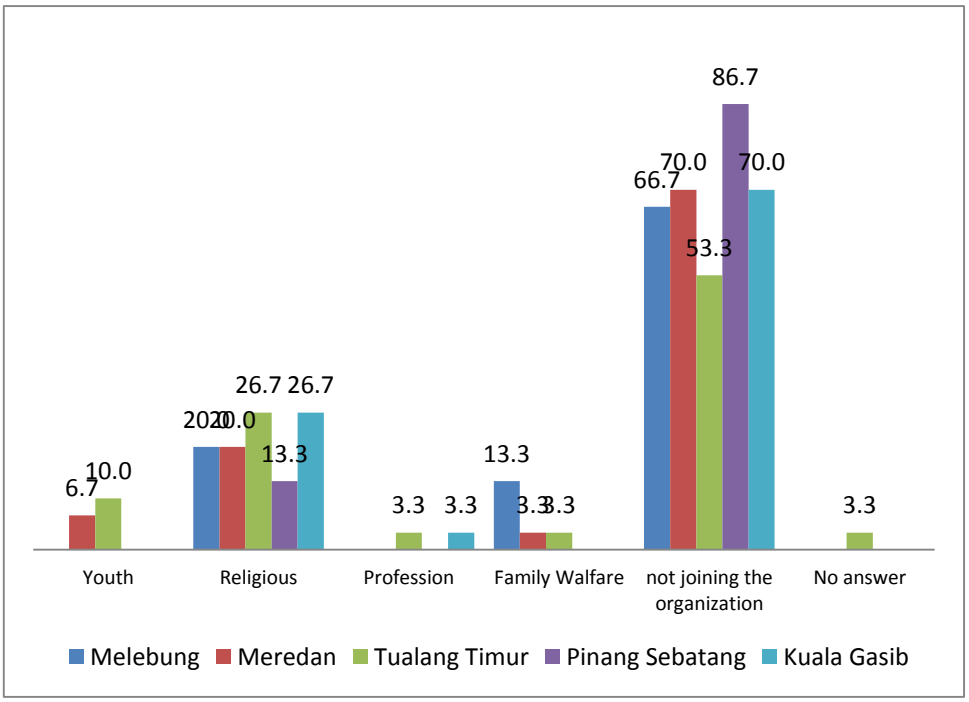

Figure 10-26 Graphs of Organization Type Followed by Respondents

From the data presented above, it is generally assumed that the majority of respondents in the five study location villages possess minimal social resources except in religious matters such as religious study groups or religious festivals. In addition, caring for the health of children under five and pregnant women also become the focus of social activities in the community through Posyandu activities.

10.7.2 Citizen Information Source

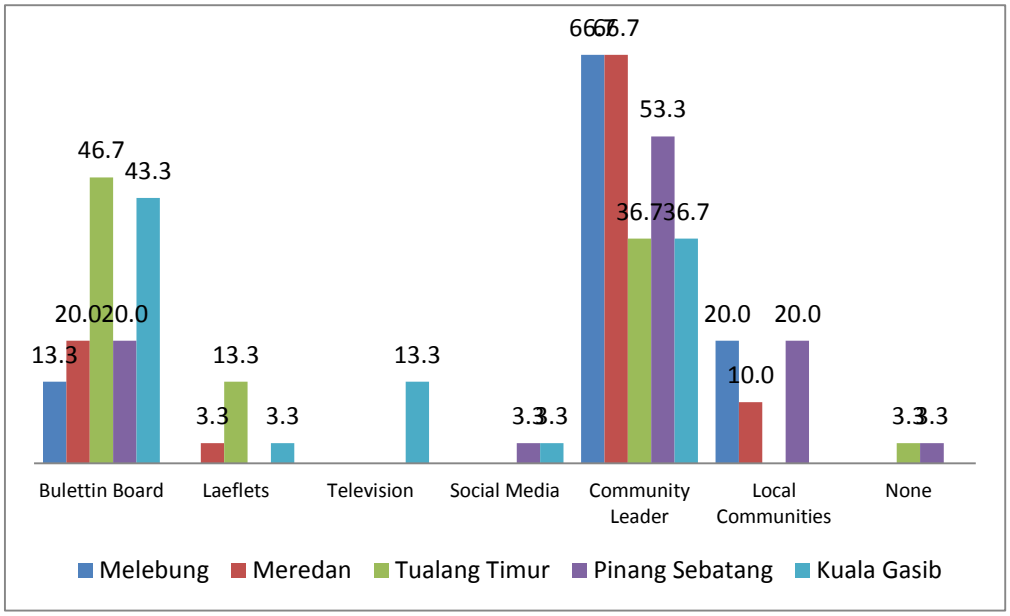

Figure 10-27 Graph of Citizen Information Source

Looking at the above data, it can be concluded that the role of community leaders is very important in the dissemination of information to the public. In addition, socialization through bulletin boards and through citizen representatives is also quite effective in disseminating information to the public.

10.7.3 Custom and Cultural Heritage

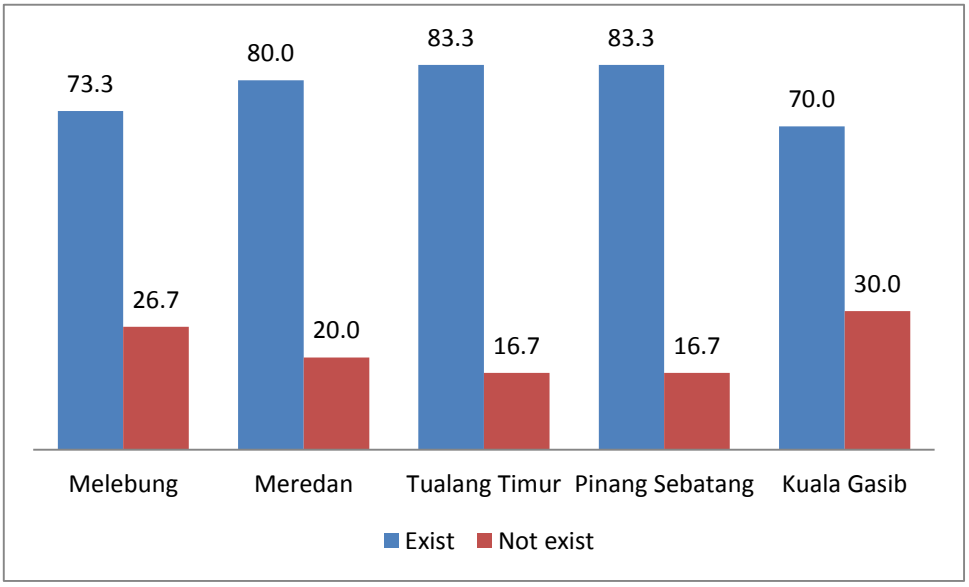

Figure 10-28 Cultural Activity in Respondent's Environment

With respect to traditions and customs in the respondent's environment, it is known that the majority of respondents stated that there are traditional or customary activities in their environment. Generally a tradition of mutual assistance at weddings, a tradition of mutual assistance in times of misfortune and tradition of welcoming Holy Month of RamAvailablen.

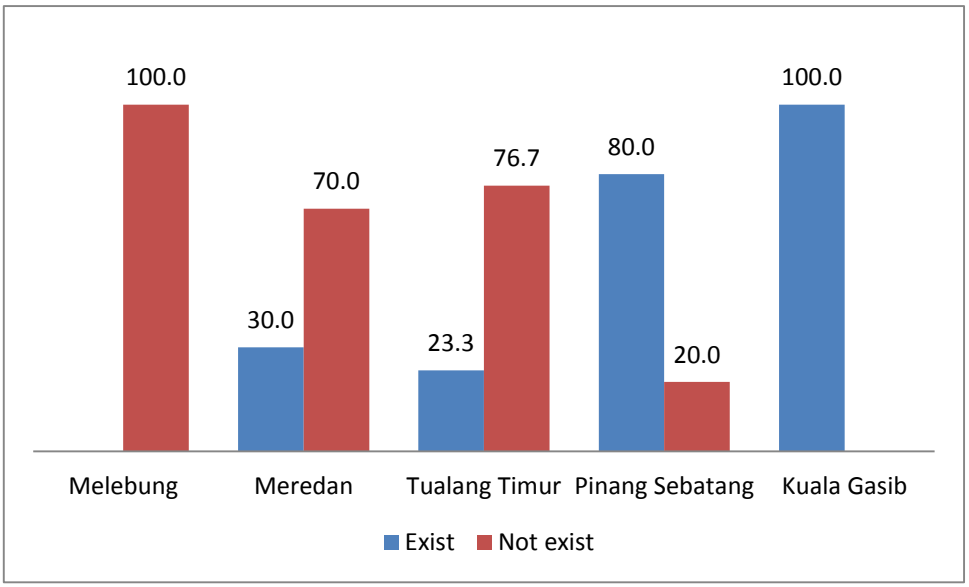

Figure 10-29 Existance of Cultural Heritage in the Respondents Environment

As for the existence of cultural heritage around the respondent's environment, as seen in the graph above, the majority of respondents in Kuala Gasib and Pinang Sebatang stated that there is a cultural heritage in their area. And there are a number of respondents in Meredan and Pinang Sebatang saying the same thing. This is in accordance with the results of observations and field interviews related to cultural heritage of the sacred tombs of the leaders of the Kingdom of Gasib.

10.7.4 Environmental Security and Order

10.7.4.1 Environmental Hazards

Figure 10-30 Graph of Frequent Environmental Hazards Occur According to Respondent

The majority of respondents stated that no environmental hazards occurred in their region. However, there are a number of respondents in Melebung and Kuala Gasib who claim frequent floods in their area. Then there are also respondents in Meredan and Kuala Gasib which states frequent fires. And there are also respondents in Kuala Gasib who claim to have experienced dust disturbance in their area

10.7.4.2 Environmental Security Condition

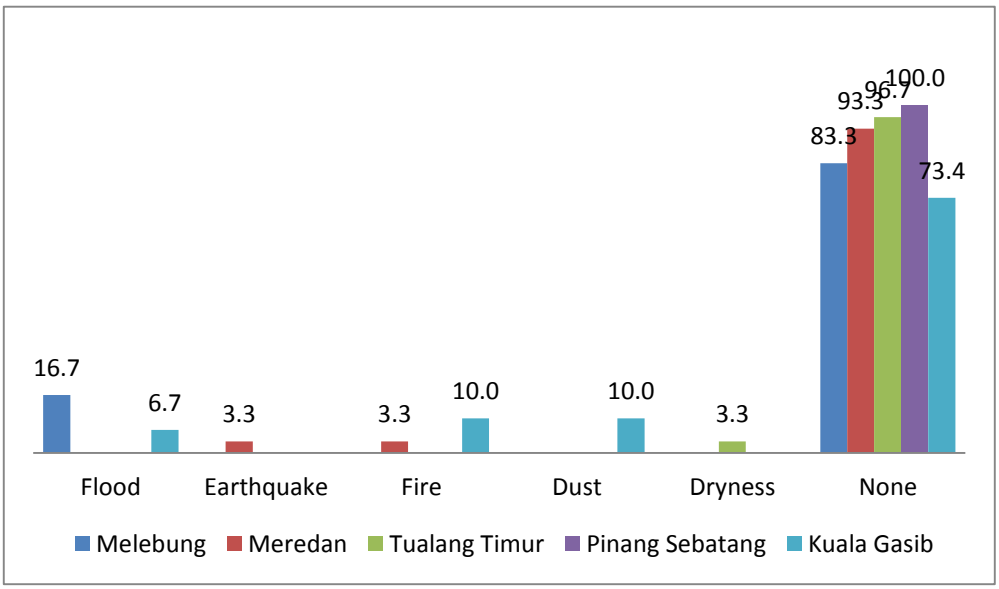

Figure 10-31 Graph of Security Condition at Respondent's Environment

Due to the environmental security condition, the majority of respondents stated it were very peaceful. Some respondents stated that the conditions in their neighborhood were peaceful. No respondents stated that their neighborhoods were not peaceful or conflict-prone.

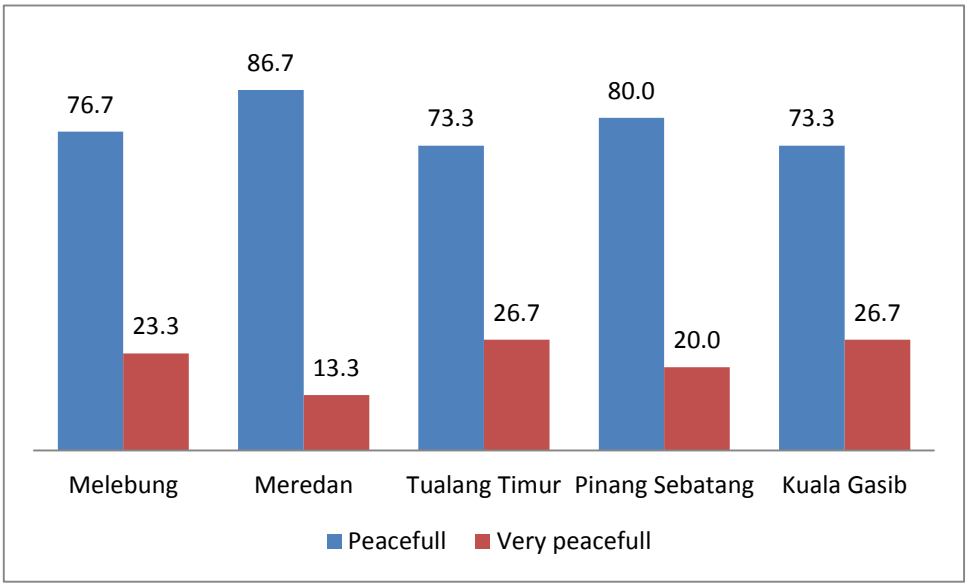

Figure 10-32 Graph of Environmental Security Conditions When Walking at Night

For environmental conditions when walking at night, the majority of respondents stated it were very safe. However, some respondents in Meredan, Tualang Timur, Pinang Sebatang and Kuala Gasib said it was not safe to walk at night. This condition is possible because the roads in this area are among the empty plantation land and no street lighting.

11 RESPONDENT'S HOUSEHOLD ECONOMIC CONDITIONS AND VULNERABLE GROUP IDENTIFICATON

11.1 RESPONDENT'S FAMILY ECONOMY LEVEL

Based on the results of the household survey data analysis, it can be seen thet the classification of respondent's economic level is on the criteria that have been described in Chapter 3.7.2 on the based Family Economy Classification, as in the following table:

Table 11-1 Respondent's Economic Level Based on the Standard of Monthly Per Capita Revenue

Desa	Below PL (< Rp 457.456)	Poor (Rp 457.456 – Rp 780.000)	Middle income (Rp 780.000 – Rp 1.580.000)	Rich (> Rp 1.580.000)
Melebung	33%	43%	17%	7%
Meredan	43%	23%	17%	13%
Pinang Sebatang	40%	23%	23%	13%
Tualang Timur	50%	23%	10%	17%
Kuala Gasib	43%	30%	20%	7%

Source : Prime data, 2018

The respondents who were classified into economic groups under the Poverty Line as well as the poor group are generally daily laborers, farmers with narrow land area, small traders, and river fishermen. Both groups of these low-income groups constitute the largest majority (73%) of the total population of respondents in the study area.

Specifically, for the middle economic group, generally they are the people who have a fixed income, such as civil servants, permanent employees in oil palm plantations, and workers in other industrial sectors. By having fixed income, of course this group needs are more assured.

On the other hand, the wealthy group number is very limited whereas they usually come from entrepreneurs (entrepreneurs) and wholesalers background. However, not all merchants in the study area have large revenues. The increasing competition of business and the lack of public purchasing power is what causes the business world is not so enthusiastic. Oil Palm trade is the most promising business. The oil palm plantation business is intermediate between the community that owns the plantation and the owners of the transport vehicle where they take the price difference from the farmers to the factory. The large number of oil palm plantations makes this type of business quite promising, but requires large business capital.

11.2 IDENTIFICATION OF VULNURABLE GROUP PRESENCE

The following table is the criteria for identifying the presence of vulnerable group with reference to the condition of the livelihood support sources owned by each respondent's household in the study site.

Table 11-2 Identification of Vulnerable Group's Household Resources

Human Resources	Natural Resources	Physical Resources	Financial Resources	Social Resources
Low education level Minimum Skill and Expertise	Do not have land Access to other natural resources is limited	Minimal ownership on physical asset and other valuables	Income is below the standard of RMW ad World Bank Per capita revenue is below the PL standard of Rp 457.536 No access to bank or ther financial sources	Social capital quality in society is low. Limited access on social networking and cooperation in socio-economic field.

Source : Prime data, 2018

Based on the above criteria, the vulnerability conditions in each respondent's household respondents will be identified in the description below..

1. Family under Poverty Line and Poor Family

In the discussion of the economic aspect, there have been a number of respondents who were identified under the Poverty Line based on the Riau Province Poverty Line standard of 2017. Thus the identified respondents will be included in the criteria of vulnerable groups because they are below the poverty line of Riau Province and and per capita income standards of the World Bank. In addition, generally those in conditions below the poverty line are also have shortcomings to other household livelihood support sources.

2. Labors

If you look at the type of work then the community groups who work as casual labors or plantation workers will also belong to the potential of vulnerable groups. This is because with an average wage of Rp 50,000 per day, then their income in one month (30 working days) is Rp 1,500,000. This figure is well below the standards of District Minimum Wage and per capita income standards of the World Bank. In addition, in reality, these workers are not necessarily getting jobs every day so their income in a month becomes uncertain. Besides, access to meet basic household needs against other resources is also limited. Based on the results of household surveys it is found that at the study sites there are 19% of respondents who have livelihoods as labors.

3. River Fishermen

In the household survey, there are no respondents who have livelihood as fishermen. This is because the focus of household surveys conducted along the gas pipeline far from the river. Nevertheless, qualitative surveys are still conducted to find out the lives of villagers on the outskirts of the Siak River.

Based on the observations and interviews result with sources related to the life of these fishermen, it is known that the current livelihood of fishermen is no longer the main source of income of the family. This condition is caused by environmental factors where the Siak River is now very polluted so that fish populations in this river has been greatly reduced. NowAvailableys it is difficult for fishermen to get fish catch and if it is obtained then the result is very minimal.

However, for the ethnic Malays who are on the banks of the river. livelihoods as fishermen can not be let go from their lives. Especially for those who are elderly. They generally continue to work in fisherman's work as a side livelihood. Thus there are still many Malay communities on the outskirts of the Siak River who become fishermen. In addition, Siak River for them not only as a place to find fish. They use their water for bathing and laundry, as well as their transportation routes. If their access to the Siak River is disturbed, it will certainly have an impact on their lives. Another thing is that these fishermen have some limitations on family resources that can potentially become vulnerable groups.

4. Female Family Head or Widow

In the discussion on the role of women in human resources, it has been explained that there are 8% of respondents who are widowed. Then from the identification results are known that in households under the Riau Province Poverty Line there is one respondent who is with a widow status Melebung Village.

While on the other two female family heads, although they were not identified as under the PL standard of Riau Province, but in terms of the amount of income were still in a very minimal condition, which ranges between Rp 500,000 - Rp 1,000,000 per month. Although they have per capita income slightly above the PL standard of Riau Province, it is still considered poor. In addition, they do not have land and other resources. Based on the results of this identification, there are two other respondents status of widows who are also classified as poor.

The following table is the respondent data with widow status who were belong to the vulnerable group.

Table 11-3 Data Recap on Widow Status Respondents which Classified as Vulnerable

Village	RT	RW	Name	Age	Number of Family Member	Education Level	Livelihood
Melebung	02	01	Mispida Wati	38	2	Tamat SLTP	Treader
Pinang Sebatang	03	05	Poniah	60	1	Tidak Tamat SD	Unemployment
Meredan	01	02	Dewi Harahap	43	3	Tamat SD	Treader

5. Elderly

The eldery in general are vulnerable due to physical limitations and reduced ability to access family resources. However, if identified more deeply by looking at the resources of household support it has, not all respondents belonging to the elderly group can be categorized as vulnerable groups.

Based on household survey results there are 13% of respondents or a number of 20 respondents including elderly (age above 60 years). Of these 30% of them are vulnerable. The table below is the data of elderly respondents belonging to vulnerable groups.

Table 11-4 Data Recap on Eldery Respondents Grouped as Vulnerable

Village	RT	RW	Name	Sex	Age	Family Member Numbers	Education Level	Livelihood
Meredan	03	01	sutikno	Male	67	4	Finished Junior High	Entrepeneur
Meredan	02	02	sutaryo	Male	70	1	Finished Junior High	Entrepeneur
Tualang Timur	01	01	syafi'i	Male	63	3	Finished Elementary	Farmer
Pinang Sebatang	03	03	japar supardi	Male	62	3	Finished High school	Labor
Kuala Gasib	03	03	Nurdin	Male	68	4	Finished Elementary	Farmer
Kuala Gasib	02	02	M Jamil	Male	61	5	Not finished Elementary	Farmer

Source : Prime data, 2018

In the data above there are five elderly respondents belonging to the category of families who are under the Poverty Line. While one elderly respondent, Shafi'i, has per capita income slightly above the PL standard, but he is still relatively poor. Aside from the below-standard income conditions, they are also identified as having little support resources for household livelihoods.

12 ANALYSIS CONFLICT AND RECOMMENDATION

12.1 GENERAL DESCRIPTION OF GAS PIPELINE AREA AND TENAYAN SGPP PROJECT FACILITIES

The construction of a gas pipeline for SGPP is expected to have a specific impact on the existing public road facilities in each village in its path. This is understandable because the construction of gas pipelines will mostly go through public roads. Each study area village has a historical background and residents' views against the existence of public road. In the area of Sumatra Highway for example, which includes Kuala Gasib and Pinang Sebatang villages, built by PT Caltex on early 1970s. Regarding this matter, one of the community leaders, Mr. Muhtar who served as head of Sekar Mayang hamlet said:

> "The road was built in 1974 built by Caltex the width of 100 meters, which is 50 meters (from the ax road) to the left and 50 meters to the right. Initially still referred to as the oil road. First the pipes are built and the road after that. After Caltex is not in operation, management is submitted to BOB (Joint Operating Body), including Siak district government and private sector. Then there is a change because there is a power line installation (power pole), with 50 m from the road. As for the existing side of the pipeline 25 meters."

Some community leaders have different views on the width of the road rights, one of the elders in Pinang Sebatang Village said that the width of the road right on the Power Line side is 52.5 meters, while on the pipeline side is 47.5 meter. On the other hand, Mr. Hasyim, a prominent public figure in Kuala Gasib, believes that the width of the road is still 50 meters

to the left and right of the road. Particularly the part that is next to the power line, in 2005 eviction had been carried out by local government. At that time, the local government cleared the permanent building which stands 50 meters from the middle of the road. Now, based on observations, there is only one permanent house that stands in Kuala Gasib Village. The building is not flattened because it has a social function, that is where the activities of Posyandu was done. Nevertheless, in general, people living in the area of Sumatra Highway have realized that the position of land located 50 meters from the road is a land owned by the local government, so they do not dare to build a permanent building and also planting perennials in the area of the land.

The second road that is planned to be traversed by the project's gas pipeline is Bakal Main Road. This road is passing through four villages namely; Pinang Sebatang, Tualang Timur, Meredan, and Melebung Villages. Uniquely, the origin of the streets segment in each village which passed through by Bakal Main Road has differents background of land owners. Especially for the areas that includes in the Pinang Sebatang Village, the piece of land of Bakal Main Road comes from was granted by local residents. Mr Muhtar said of this as follows:

> "The Bakal Main Road was recently built in 1997. Most of the people granted their lands for the road development, only locally owned plants are compensated. The land is a grant from the community. Initially the width of the road is only 9 meters with the width of the right road on the left and right side of the road 6 meters, so the total width of the road rights is 21 meters. I know because I used to have land there. There is a National Land Agency (BPN) that claims it (width) 50 mater. That's wrong, because that new road is not the same as Sumatra Highway (PT Caltex). Until now people of BPN did not dare to claim".

Based on the narrative of Mr. Muhktar above, it is known that historically the width of the road right on Bakal Main Road innitally is 21 meters, with the road width of 9 meters wide and the road wide rights on the righta nd left side is 6 meters. Meanwhile, according to information obtained from the Hamlet Head who live on Bakal Main Road, Mr. Hendri said that the Government has raised the status of the road into a provincial road. Thus, the total width of the right of the road is 40 meters, with each road rights width 20 meters from the road on the right and left side. This is reinforced by the difficulty of residents to get the Buiilding License / Certificate of land, because according to the (Nation Land Beareau) BPN, the buildings on the curbside should be within 20 meters of the road. He also has a building on the edge of the road less than 20 meters from the road. This West Sumatran man is expecting that in the future should there are pipe line construction done then his house will be exposed to the pipeline and must still get the right compensation.

Figure 12-1 Zero Spot for Gas Pie Construction in Kuala Gasib Village

Tualang Timur region has a different history from Pinang Sebatang Village. The emergence of a village on the edge of Bakal Main Road was originally associated with the establishment of an oil palm plantation company, then known as Salim Group. Most people consider the boundary between the main road and their land is a ditch less than two meters from the road. Government-owned buildings like SMP N 2 Tualang's (State Junior Highschool 2 Tualang) fence is very close to Bakal Main Road. Penghulu (Village Head) of Tualang Timur Village Mr Bahari says this as follows:

> "Initially this area here is included into the Cultivation Rights of PT Aneka Inti persda, Parent of Salim Group. After the reformation this area was confiscated by the state, when Megawati became president then sold to a Malaysian plantation company, and on behalf of PT Mina Mas. Recently there is an initiative from the company, the last two months, there is an agreement between the company and the community, so there will be no mutual claims While according to the Governor's decision, on the 500 meter area of the right and left side of the road is for the community. Thus, the community can already take care of the certificate again, the company also does not need to pay taxes for areas owned by the community. To mark the width of the road right then in 1991 was built a ditch two meters from the asphalt road. Therefore, the land on the outside of the ditch on Bakal Main Road is the right of the community. So far there has been no circular letter on improving the status of roads into provincial roads ".

Mr. Bahari's own house is only 5 meters away from the asphalt road and its position is right after the trench. He has planted his home yard with hard plants. Although he insisted that the road limit was only on the road ditch, it still supported the construction of gas pipelines. For him the interests of the government should be supported, because there must be a positive impact for development in the region. However, he asked the related parties to have negotiations before the pipeline construction project is implemented. This is mainly related to the compensation issue for community-owned assets that are affected by the construction of the pipeline.

In Meredan Village area passed by Bakal MAin Road mostly on the left and right is owned by PT Aneka Inti PersAvailable which formerly known as PT Salim. According to one of the company's managers, Mr. Suwarto, that the pipeline development permit problem will need to be communicated directly with their company head office which is located in Jakarta. This is understood because all policy decisions are the authority of the corporate management in the head office, while the office in the plantation area only takes care of the technical issues related to the production of the plantation.

Most of Meredan Village area that is going to be traversed by gas pipeline is also the area owned by PT Aneka Inti PersAvailable. However, the road that connects Meredan's village area with Pekanbaru city is an old road. The road was built by PT ITT, which has been closed since the 1970s. The company is engaged in the timber industry, where timber from logged-over forest then sent through the port which was located in this Meredan village. In detail Mr. Safrizal who is one of the scribes in the village's office said:

> “The provisions on boundaries of road rights have not existed, there is only an existing elephant trench from PT Salim (PT AIP). There is already information that the status of the road has become a provincial road, but its official and written determination does not seem to be. Initially the area of Bakal Main Road in Meredan Village is the company road. The local government only continued. The initial position of the road is in front of the Village office, which was built by PT ITT. In 1970 the company was closed. Its pier used to be in Meredan. If there is a community village, it belongs community”.

Thus, the existing roadside status in Meredan Village tends to be similar to the conditions in Tualang Timur Village. The difference is, the number of residents who live on the edge of the road in Meredan Village area is fewer than the Tualang Timur Village. This is understood because Meredan is an old village that most of its people live around the edge of the Siak River. In addition, road traffic conditions in Tualang Timr Village is more crowded because of the many vehicles that will pass through Meredan Bridge from the direction of Prawang towards the city center of Siak District or vice versa.

Then for Melebung Village, the gas pipeline is planned to go through village's street and indvdually owned plantation. Village's street, its history is the same as the road in Meredan Village built by timber company PT ITT before 1970. In the past, the community granted the land to be built by PT ITT for road. NowAvailableys, on the left and right side of the road has become the property of individuals, where most have been owned by people outside of Melebung Village because of the sale and purchase of land. Likewise, oil palm plantations will be traversed by gas pipelines, mostly owned by big businessmen like Tony Chandra, Sihombing, and some members of Korem (Military Resort Command) like Mr. Iswardi.

Figure 12-2 Lumber Carrying Trucks Passing Through Meredan Village Road

In summary, the location of the site area for the construction of the project's gas pipelines and its current tenure is as presented in the table below.

Table 12-1 Gas Pipeline Site Area and Land Ownership Status

Kampung/Village	Land being used	Land ownership status
Kuala Gasib	Sumatra Highway	Owned by Siak District
Pinang Sebatang	Sumatra Highway and Bakal Main Road	Owned by Siak District and community
Tualang Timur	Bakal Main Road	Owned by community and PT AIP
Meredan	Bakal Main Road	Owned by community and PT AIP
Melebung	Melebung Road and oil palm plantation	Owned by community and individual company
Tenayan Industri	oil palm plantation	Owned by community and individual company

12.2 LAND DISPUTE PROBLEM IN PROJECT SITE AREA

Tenayan Industri is the end point of the gas pipeline where it also will be built Medco Ratch Power SGPP sites. Land issues in this area are similar to those in Melebung Village. Land conflicts often result from overlapping in land ownership. Hamlet 02 Head, Mr. Kalayo Hasibuan said:

> "There has been three times of letters changes for the construction location area of SGPP in Tenayan Industri. Initially there was a problem of mutual claims but in the end it can be resolved. Secondly, there are already five people who definitively own the land, but since most landowners are officials of the Pekanbaru City Government, and because they are afraid of problems with the tax authorities and other financial inspection institutions, the current status of land ownership is being administered to be authorized to one person

only, namely Suryadi Paijan. Regarding the amount, I do not know because it is still in the process of making a land certificate. But there will certainly be payments."

The land problems in the Indsutri Tenayan and Melebung Villages are complex. Currently, there is still a land dispute on the former location of PT Bintan whose Cultivation Rights (HGU) has been expired since 1995. The land of the company, which is engaged in the oil palm plantation, is now claimed by several people on behalf of farmer groups. They still occupy the area before there is compensation from the Pekanbaru City Government. It is suspected, those who still insist on occupying the former land of PT Bintan has a strong relationship with some officials of Pekanbaru City Government. Currently they only have SKTE (Letters of Information) from RT / RW, where this is certainly a very weak letter as a proof of land ownership. Part of the land has now been built for SGPP facilities. 70th Road location , which separates Tenayan and Melebung Villages initially also included as part of the former land of PT Bintan.

Currently, there is still a land dispute by two businessmen namely Meriyani and Edi Suryanto. Two people who still have family relationship, include as businessmen who own many land in Industri Tenayan Village and also Melebung Village. The conflict between this two Chinese ethnic businessmen is quite burdensome to the community, especially those who are affiliated with the disputed land, the head of RT and RW and former landowners. Mr Syamsir again said "maybe they really want to trouble us, every session we are called to be a witness. So what is the problem, they both have a lot of money. They also still have family ties ".

In a previous study report has already been mentioned about land conflict related to efforts of Batin Tenayan to get back their rights of customary land in Industri Tenayan district. At that time, Haji Si'in who claimed to be Batin Tenayan and the community who supported him, claimed to have customary land rights in the area. Currently, Pekanbaru City Government no longer recognizes the existence of customary land in the region. This is understood, because since a long time ago the Batins, like Gasib Batin and Tenayan, have already given their authority to the government. Then, the Batin include into the structure of village government at that time. Thus, the real claim to customary land already does not have a strong legal basis in the eyes of the law. Unlike Haji Si'in, Batin Gasib, familiarly called Mr. Sabo, he realizes that he no longer has the right to customary land. He admitted that in the past, his predecessor had already handed the authority over to the government. then, for his privately owned land there was already compensation from the company that was then getting HGU from the central government.

The confusion of land ownership in Tanayan Industri and Melebung area is of course related to future development plan. Tenayan Raya District in the future will be the governement center of Pekanbaru City and also Center of Industrial Estate. This has certainly triggered many parties to benefit from land tenure in the region. Even according to Mr. Kalayo, the head of Rw 02 Tenayan Industri, said that the planting of oil palm trees is only in the effort to maintain their land. Actually the land owners have prepared the land for other uses that are considered more profitable in the future if the development in Tenayan Industri and Melebung area has been running.

12.3 RESPONDENT INFORMATION RELATED TO CONFLICT

12.3.1 Frequent Conflict that Occurs According to Respondent

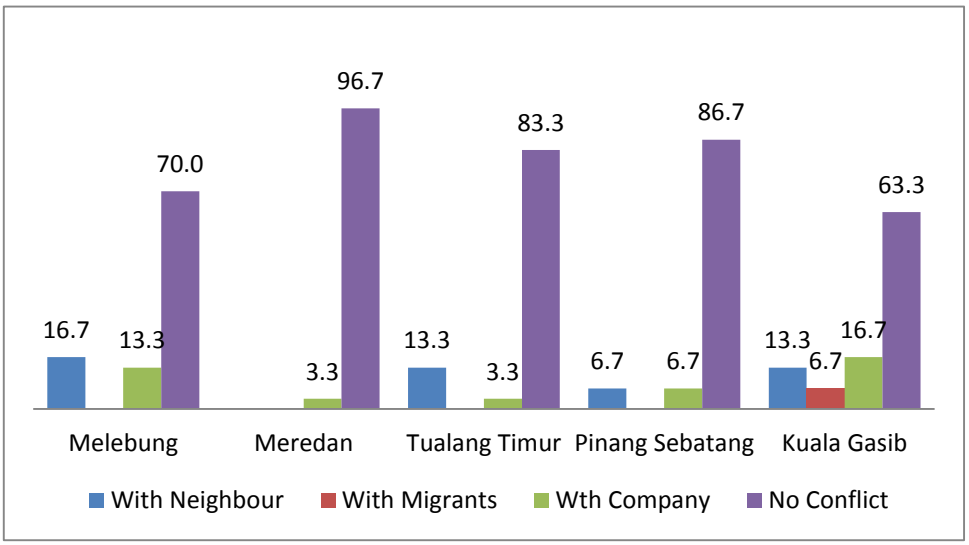

Figure 12-3 Graph of Frequent Conflict that Occurs According to Respondents

The majority of respondents stated there was no conflict in their neighborhood. As for respondents who responded to a conflict, it was generally a conflict with neighbors. And there are a number of respondents in Melebung and Kuala Gasib who stated that there are frequent conflicts between the community and the company, in this case the plantation company.

12.3.2 Cause of Conflict According to Respondents

The causing factors of conflict that often occur in the community according to respondents information can be seen in the following graph

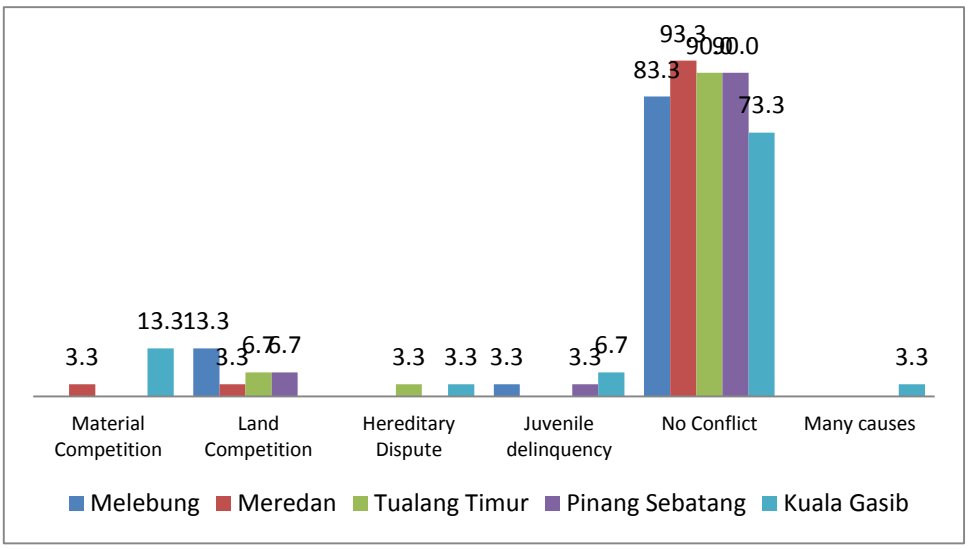

Figure 12-4 Graph of Cause of Conflict According To Respondents

Respondents who claimed ther are frequent conflicts in their neighborhoods, provided information about the causes of conflict generally were due to land disputes. If associated

with the previous information, then the seizure of land occurs generally is between neighbors and companies.

12.3.3 Party Which Resolved the Conflict According to Respondents

Then in the settlement of the conflict that occurs, the parties who can resolve the conflict according to the respondents can be seen in the following graph:

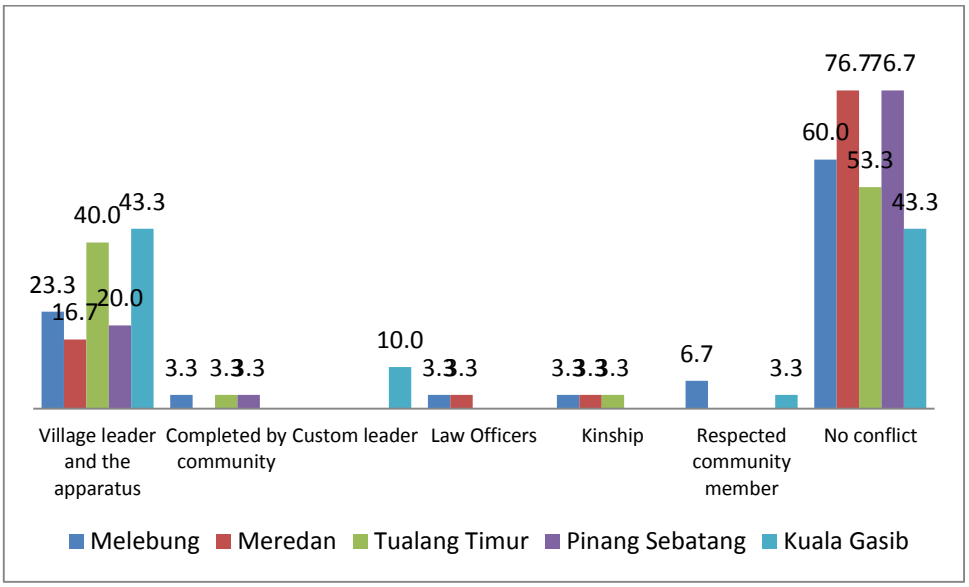

Figure 12-5 Graphs of Parties Who Resolved Conflict According to Respondents

According to the majority of respondents, those who can resolve the conflict is the Village Head and his apparatus. And there are also quite a number of respondents who mention the Custom Leader or respected member of the community can be the party to resolve the conflict.

12.3.4 Conflict Resolution Mechanisms by Respondents

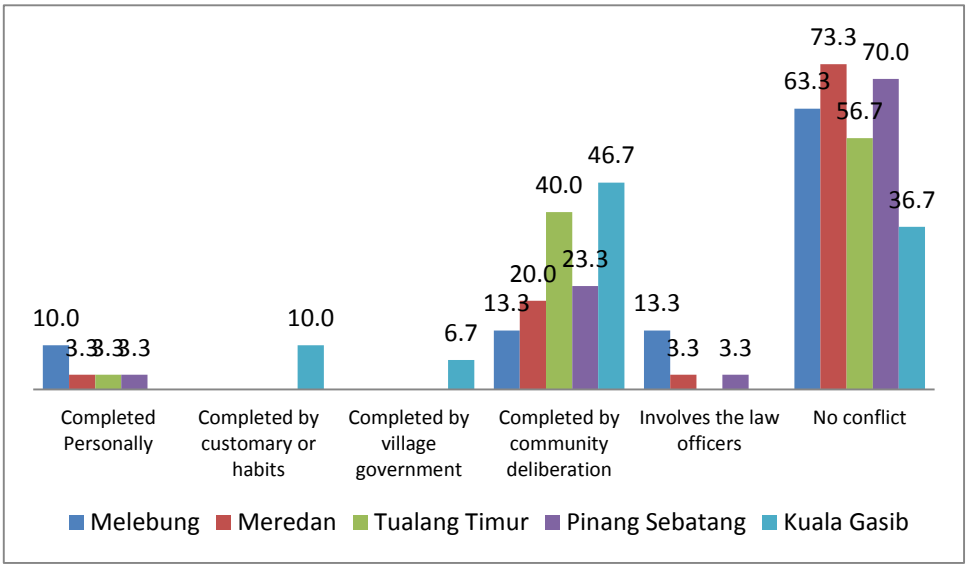

Figure 12-6 Graph of Conflict Resolution Mechanism According to Respondents

Furthermore, for the conflict resolution mechanism according to most of the respondents is through deliberation of villagers. Some of the other respondents mentioned that the mechanism of conflict resolution is resolved between conflicting individuals. While in Kuala Gasib there are a number of respondents who stated that the mechanism of conflict resolution is through customary settlement.

12.4 RESPONDENT PERCEPTION AND ADVICE TO THE PROJECT

In the following graph it can be seen that the majority of respondents in Melebung, Pinang Sebatang and Kuala Gasib stated of not knowing about the SGPP gas pipeline project planning in their area. While in Meredan, the majority of respondents said they already knew about this project. The composition of respondents in Tualang Timur is balanced between respondents who know and who do not know about the project.

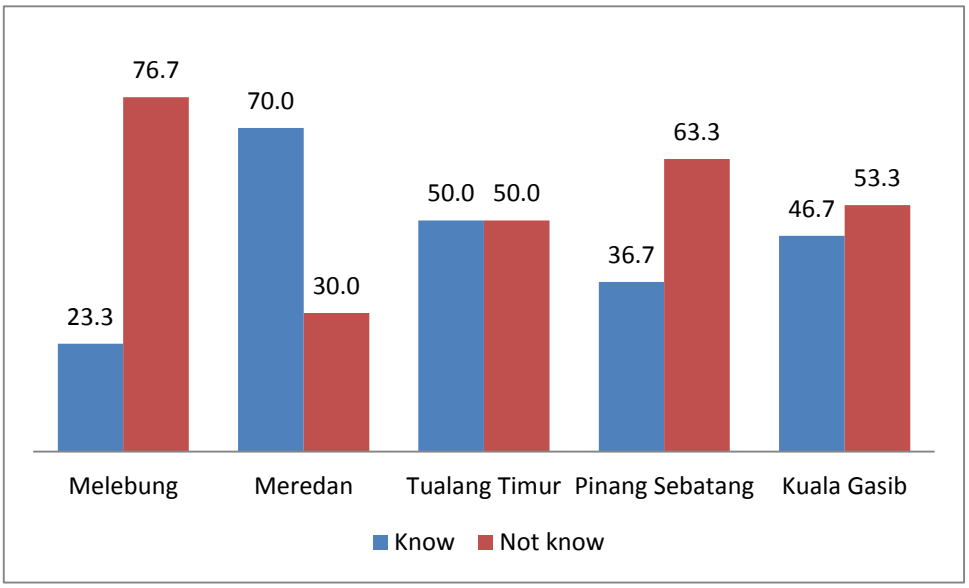

Figure 12-7 Graph of Respondents' Knowledge of the Project

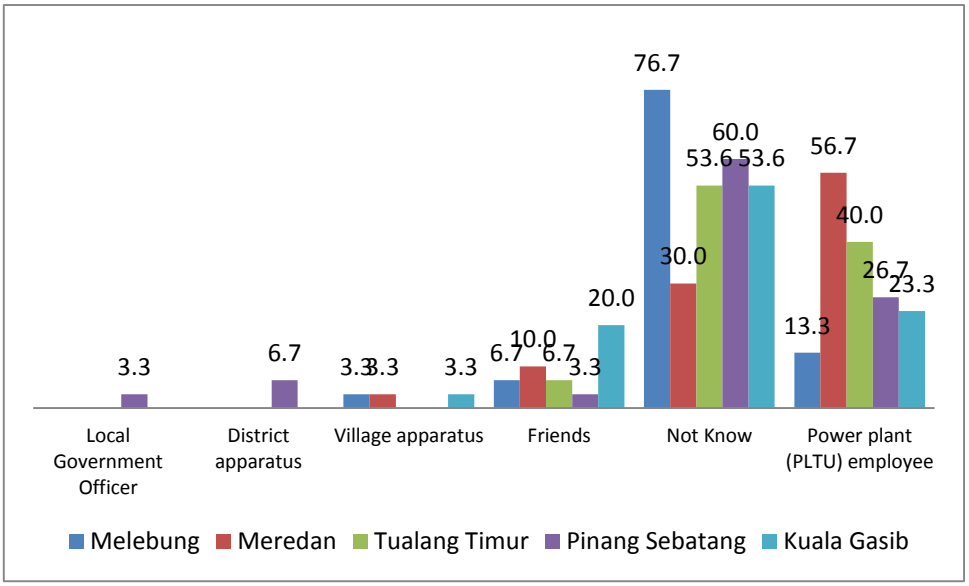

Figure 12-8 Graph of Respondents' Source of Information on the Project

Respondents' information about the project according to the information of most of the respondents is from SGPP employees and from friends. The possibility of SGPP personnel here is the field survey officer at the time of environmental studies and technical survey which then spread through word of mouth through information of friendship.

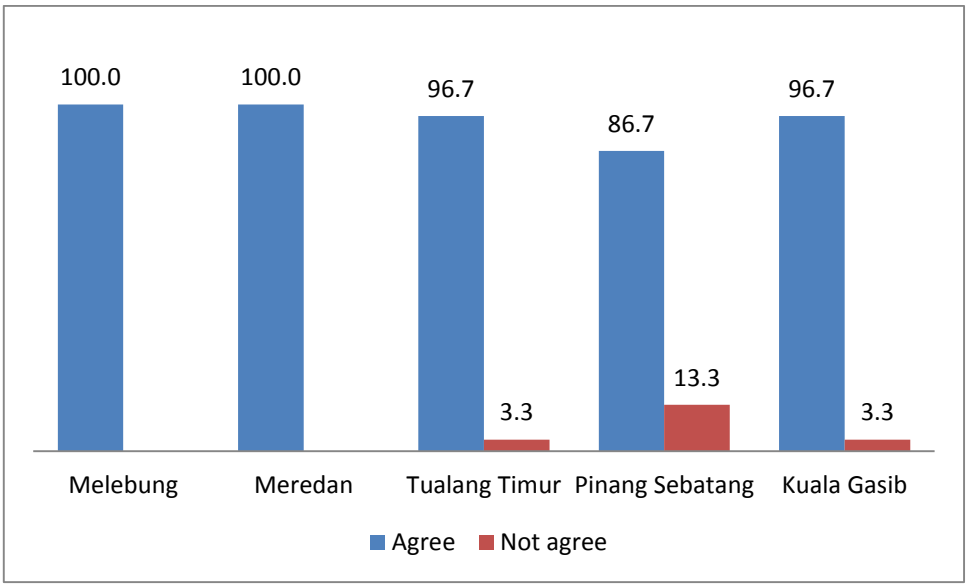

Figure 12-9 Graph of Respondent's Preception About the Project

In the graph above it can be seen that the majority of respondents agreed on the SGPP gas pipe project installation plan in their area. And there are a small proportion of respondents in Tualang Timur, Pinang Sebatang and Kuala Gasib who disagree with the project plan.

Here are the reasons for disagreeing with the project:

1. Can be built if not dangerous and not near settlement
2. Must be safe because in the neighborhood
3. Do not freely cutting off people's trees, ask permission to the owner and village apparatus, be politeBoleh dibangun apabila tidak membahayakanand tidak dekat pemukiman
4. Do not disturb the community, there is a compensation if it touch a private land
5. Do not harm the community, development goals must be in the public interest
6. Do not interfere with community activities
7. Do not interfere with community, do not evict
8. Do not disadvantage
9. Do not harm the community, if the land is subjected it is expected to receive appropriate compensation.
10. If you touch the land please change the price accordingly
11. Security must be ensured
12. Confirmation with local village officials, do not take personal advantage, no lie among us
13. The sooner the better
14. It will only harm the community, no benefit because it just passes through
15. As resident there should be calculation when evicted
16. Build as soon as possible so ther will be electricity
17. Will it disturbing and explode?

18. Too close to the settlement and community

While the suggestions and expectations of respondents to the project are as follows:

1. There is notification to the community
2. There will be protection toward the gas, no more frequent power outage
3. There should be a socialization to the community regarding the benefits and impacts
4. There should be job opportunities
5. Beneficial for the community that needs it
6. As long as it is safe
7. As long as it is not harming to the people and hindering activities
8. Dangerous, lack of benefit. Don't just because there is a gas pipe the community suffer, only passing through but still dark here
9. Should something happen take responsibility
10. Please let electricity come to our village
11. Notification prior to eviction
12. Hastened so the electricity can run
13. Please pay attention to community's safety
14. Try to find job at the place, do not disadvantage
15. Compensation for land owner ,
16. No leak on gas pipe, personal data must be kept in convidential
17. Transparent compensation
18. Must be safe and no harmfull for the community
19. Must follow the SOP so not harming the community
20. When the project is developed please give aid to the people
21. Do not passes through people settlements
22. Do not disturb community's needs
23. Do not disturb the facilities used by the community
24. Beneficial for surrounding community, there should be lighting on the street
25. Don't be that the pipe has passes through our front yard but no electricity in our home, please hastened so there will be electricity
26. Should there is a proposal from the village please give aids
27. Should there is a development project please give attention to village development especially clean water procurement, and should the SGPP project is subjecting people's land please compensate
28. There should be feedback for those whose building subjected to gas pipe passes through, such as aid or good respond if asked for help
29. Please quickly bulid it
30. The people in the plantation should be paid attention to
31. Low economic people should be paid attention to
32. Realizing whats been promised to
33. Hopefully the elderly is paid attention to
34. Afraid will explode, please check the gas pipe every month

12.5 RECCOMENDATION

Some recommendations based on the results of this baseline social study are as follows:

1. It is important for the project implementers to involve local government (village), customary figures, community and religious leaders in conducting various approaches to the community at the study site;
2. The importance of the company to assist local communities, in particular in terms of:
    - Facilitate dropout children especially at junior and senior high schools;
    - Assisting the availability of medical personnel in Pustu and Puskesmas;
    - Assisting the provision of clean water facilities for the community;
    - Assist the provision of electricity and street lighting facilities;
    - Supporting the provision of community garbage and liquid waste management facilities;
3. The project implementation should maintain and protect the cultural heritage in the study area;
4. Project Implementers should maintain the interests of communities utilizing the Siak River; and
5. The Company needs to pay attention to the existence of vulnerable groups and the poor.
6. For the effort of economic development program of local community, the company should involve PKK group, Karang Taruna or Quran Recital group considering the existence of local association groups have been functional enough to the community in the study location;

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APPENDIX 01

RESPONDENT'S DATA OF FAMILY UNDER THE POVERTY LINE

Melebung Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Ibrahim	Rasmita	Perempuan	45	01	01	bukan jalur pipa	Tamat SD	Buruh		6	2.700.000	450.000
2	Wahyu Hidayat	Linda	Perempuan	33	01	01	bukan jalur pipa	Tamat SD	Buruh		3	1.000.000	333.333
3	Khairul	Rika	Perempuan	30	02	01	bukan jalur pipa	Tamat SLTA	Buruh		5	800.000	160.000
4	Susanto	Susanto	Laki-Laki	41	04	01	jalur pipa	Tamat SD	Buruh	-	5	2.000.000	400.000
5	Pandi Tarigan	Sela Wati	Perempuan	33	01	01	bukan jalur pipa	Tamat SLTA	Supir	-	5	2.000.000	400.000
6	Hadi Susanto	Ria Agustina	Perempuan	26	02	01	jalur pipa	Tamat SD	Supir	-	6	1.300.000	216.667
7	Nasution	Nasution	Laki-Laki	28	01	02	bukan jalur pipa	Tamat SD	Buruh	-	3	1.000.000	333.333
8	Zulkarnain	Lia Wati	Perempuan	35	01	02	bukan jalur pipa	Tamat SLTP	Buruh	kebun	5	1.000.000	200.000
9	Saparudin	Saparudin	Laki-Laki	55	01	02	bukan jalur pipa	Tidak Sekolah	Petani	-	3	1.200.000	400.000
10	Mispida Wati	Mispida Wati	Perempuan	38	02	01	bukan jalur pipa	Tamat SLTP	Pedagang	-	2	500.000	250.000

Meredan Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Panji Saputra	Panji Saputra	Laki-Laki	29	03	01	jalur pipa	Tamat SD	Buruh		4	1.200.000	300.000
2	Misgiono	Sulisnawati	Perempuan	37	01	02	jalur pipa	Tamat SD	Petani	kerja bangunan	5	1.600.000	320.000
3	Sutikno	Sutikno	Laki-Laki	67	03	01	jalur pipa	Tamat SLTP	Wirausaha	-	4	800.000	200.000
4	Tohong Harahap	Tohong Harahap	Laki-Laki	36	01	02	jalur pipa	Tamat SLTP	Buruh	-	6	1.800.000	300.000
5	Abu Bakar	Abu Bakar	Laki-Laki	75	01	02	jalur pipa	Tamat SD	Buruh	-	3	600.000	200.000
6	Edison	Marnis	Perempuan	29	02	02	bukan jalur pipa	Tamat SD	Petani	-	4	1.500.000	375.000
7	Tompul	Tompul	Laki-Laki	47	03	02	jalur pipa	Tamat SLTA	Pedagang	-	6	2.000.000	333.333
8	M Sahran Hasibuan	M Sahran Hasibuan	Laki-Laki	55	01	02	jalur pipa	Tamat SLTA	Pedagang	-	6	2.000.000	333.333
9	Amrin	Mia	Perempuan	31	02	02	bukan jalur pipa	Tamat SD	Petani	-	4	1.500.000	375.000
10	Shopan	Shopan	Laki-Laki	41	02	02	bukan jalur pipa	Tamat SD	Petani	menderes	4	1.200.000	300.000
11	Sutaryo	Sutaryo	Laki-Laki	70	02	02	jalur pipa	Tamat SLTP	Wirausaha	bangun rumah	1	200.000	200.000
12	Nazarudin	Naarudin	Laki-Laki	40	02	02	jalur pipa	Tidak Sekolah	Petani	-	4	1.200.000	300.000
13	Dewi Harahap	Dewi Harahap	Perempuan	43	01	02	jalur pipa	Tamat SD	Pedagang	-	3	300.000	100.000
13	Sukari	Sukari	Laki-Laki	47	01	03	jalur pipa	Tamat SLTP	Supir	-	6	2.000.000	333.333

Pinang Sebatang Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Bahir	Anisah	Perempuan	53	03	04	jalur pipa	Tidak Sekolah	Petani	-	5	1.040.000	208.000
2	Suhendry	Suhendry	Laki-Laki	37	03	05	jalur pipa	Tamat SLTP	Pedagang		5	2.000.000	400.000
3	Sukanta	Sulia	Perempuan	31	03	05	bukan jalur pipa	Tamat SD	Supir	muat buah	3	1.000.000	333.333
4	Supriadi	Dormian	Perempuan	48	03	05	jalur pipa	Tamat SLTA	Buruh	babat dan nyemprot	7	1.500.000	214.286
5	Imang Mujiono	Delima	Perempuan	27	03	03	bukan jalur pipa	Tamat SD	Petani		5	1.500.000	300.000
6	Gafar	Gafar	Laki-Laki	52	03	04	bukan jalur pipa	Tamat SD	Petani		5	2.000.000	400.000
7	Juli Suwandi	Sri Lolita	Perempuan	40	02	05	jalur pipa	Tamat SLTA	Wirausaha	mekanik/montir	5	2.000.000	400.000
8	Hardian	Hardian	Laki-Laki	35	03	05	jalur pipa	Tamat SLTA	Wirausaha		6	2.083.333	347.222
9	Suryadi	Upik	Perempuan	45	03	05	jalur pipa	Tamat SLTP	Wirausaha		5	500.000	100.000
10	Suratmin	Suratmin	Laki-Laki	51	03	05	jalur pipa	Tamat SLTP	Serabutan		5	1.200.000	240.000
11	Anto Bustami	Anto Bustami	Laki-Laki	42	03	05	jalur pipa	Tamat SLTP	Wirausaha		6	2.400.000	400.000
12	Japar Supardi	Japar Supardi	Laki-Laki	62	03	03	jalur pipa	Tamat SLTA	Buruh		3	500.000	166.667

Tualang Timur Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Freddin	Freddin	Laki-Laki	35	02	01	jalur pipa	Tamat SLTA	Petani		5	1.800.000	360.000
2	Edi	Ponijem	Perempuan	38	02	02	bukan jalur pipa	Tamat SLTP	Pedagang		3	500.000	166.667
3	Sudirman	Sudirman	Laki-Laki	38	01	01	jalur pipa	Tamat SD	Buruh		5	1.800.000	360.000
4	Marpaung	B. Siagian	Perempuan	39	01	01	jalur pipa	Tamat SD	Petani		7	2.000.000	285.714
5	Kasbahari Tampubolon	Kasbahari Tampubolon	Laki-Laki	52	01	01	jalur pipa	Tamat SLTA	Petani	pak RT	8	2.025.000	253.125
6	Endang S	Endang S	Laki-Laki	43	02	02	jalur pipa	Tamat SLTA	Pedagang	-	5	1.000.000	200.000
7	Syahrial	Kasnita	Perempuan	43	01	02	jalur pipa	Tamat SLTP	Petani		6	2.500.000	416.667
8	Jujun	Jujun	Laki-Laki	35	02	01	jalur pipa	Tamat SD	Petani		5	300.000	60.000
9	Dono	Dono	Laki-Laki	56	02	01	jalur pipa	Tamat SD	Pertukangan		5	1.000.000	200.000
10	Iqbal	Ati	Perempuan	45	03	01	jalur pipa	Tamat SLTA	Wirausaha		10	3.500.000	350.000
11	Efendi	Darlinus	Perempuan	53	03	01	jalur pipa	Tamat SD	Wirausaha		5	2.000.000	400.000
12	Kondar Muda	Mondar Muda	Laki-Laki	38	03	01	jalur pipa	Tamat SLTA	Buruh	jualan	4	400.000	100.000
13	Iwan	Lami	Perempuan	48	01	02	jalur pipa	Tidak Sekolah	Pedagang		5	1.500.000	300.000
14	Masfardi	Azwel	Laki-Laki	43	02	02	bukan jalur pipa	Tamat SLTP	Petani		4	1.500.000	375.000
15	Abdul Rahman	Abdul Rahman	Laki-Laki	45	02	02	jalur pipa	Tidak Tamat SD	Petani	-	5	900.000	180.000

Kuala Gasib Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Dino	Lastri	Perempuan	29	01	01	jalur pipa	Tamat SLTA	Petani	Mencari Ikan	5	2.000.000	400.000
2	Sutrisno	Suryani	Perempuan	33	03	03	jalur pipa	Tamat SD	Petani		5	1.000.000	200.000
3	Darwis	Riana	Perempuan	24	02	02	jalur pipa	Tidak Tamat SD	Karyawan Swasta		3	1.000.000	333.333
4	M Jamil	M Jamil	Laki-Laki	61	02	02	jalur pipa	Tidak Tamat SD	Petani		5	1.300.000	260.000
5	Arifin	Arifin	Laki-Laki	54	02	02	bukan jalur pipa	Tamat SD	Petani		6	2.500.000	416.667
6	Saldi Rifai	Leni Maisarah	Perempuan	22	02	03	jalur pipa	Tamat SLTA	Petani		2	600.000	300.000
7	Isran	Isran	Laki-Laki	44	03	03	jalur pipa	Tamat SLTP	Petani	serabutan	4	1.500.000	375.000
8	Karim	Karim	Laki-Laki	49	03	03	jalur pipa	Tamat SLTP	Pedagang		6	2.000.000	333.333
9	Ahmad Fauzan	Sukarmi	Perempuan	40	03	03	jalur pipa	Tamat SD	Petani		8	3.000.000	375.000
10	Nurdin	Nurdin	Laki-Laki	68	03	03	jalur pipa	Tamat SD	Petani		4	1.000.000	250.000
11	Saparudin Lubis	Hindun	Laki-Laki	50	02	02	jalur pipa	Tamat SD	Petani	Pengobatan Alternatif	6	1.000.000	166.667
12	A Dahlan Sirait	A Dahlan Sirait	Laki-Laki	46	02	02	jalur pipa	Tamat SLTA	Petani	-	6	2.000.000	333.333
13	Darma	Darma	Laki-Laki	39	02	02	jalur pipa	Tidak Tamat SD	Petani	-	4	1.040.000	260.000

APPENDIX 02

RESPONDENT'S DATA ON POOR FAMILY

Melebung Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita

Meredan Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Badaruddin	Badaruddin	Perempuan	56	01	02	jalur pipa	Tamat SD	Buruh	-	6	3.000.000	500.000
2	Dedi	Dedi	Laki-Laki	31	02	03	bukan jalur pipa	Tamat SD	Petani	-	3	2.000.000	666.667
3	Isromi	Rahmasari	Perempuan	25	04		bukan jalur pipa	Tamat SD	Karyawan Swasta	memancing dan berburu	3	2.000.000	666.667
4	Edison	Edison	Laki-Laki	48	01	02	jalur pipa	Tamat SD	Petani	Ternak	5	3.000.000	600.000
5	Bayu Angga	Ernidawati	Perempuan	30	01	02	jalur pipa	Tamat SLTP	Buruh	-	4	2.500.000	625.000
6	Tamara	Tamara	Perempuan	31	03	01	bukan jalur pipa	Tamat SLTA	Karyawan Swasta	-	4	2.000.000	500.000
7	Arfan	Andriani	Perempuan	16	01	02	jalur pipa	Tamat SLTA	Karyawan Swasta	-	6	2.800.000	466.667

Pinang Sebatang Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Amin	Liza	Perempuan	31	02	05	jalur pipa	Tamat SD	Supir		3	2.000.000	666.667
2	Poniah	Poniah	Perempuan	60	03	05	bukan jalur pipa	Tidak Tamat SD	Tidak Bekerja		1	650.000	650.000
3	Fitra	Pariatik	Perempuan	30	05	02	bukan jalur pipa	Tamat SLTA	Wirausaha		5	3.000.000	600.000
4	Sahrial	Sulasmi	Perempuan	43	03	03	bukan jalur pipa	Tamat SD	Supir		3	1.500.000	500.000
5	Arman Hasibuan	Arman Hasibuan	Laki-Laki	39	03	03	jalur pipa	Tamat SLTA	Karyawan Swasta	Bertani	5	2.500.000	500.000
6	Susanto	Santi	Perempuan	43	04	04	jalur pipa	Tamat SLTP	Karyawan Swasta		5	2.900.000	580.000
7	Sahputra	Sahputra	Laki-Laki	34	03	05	bukan jalur pipa	Tamat SLTP	Petani		4	3.000.000	750.000

Tualang Timur Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Nehemia Tholib	Nehemia Tholib	Laki-Laki	56	01	01	jalur pipa	Tamat SD	Tidak Bekerja		5	2.300.000	460.000
2	S Sitorus	M Silitonga	Perempuan	50	01	01	jalur pipa	Tamat SLTA	Pedagang	berkebun	6	3.000.000	500.000
3	Syafi'i	Syafi'i	Laki-Laki	63	01	01	jalur pipa	Tamat SD	Petani		3	1.500.000	500.000
4	Syamsahir	Syamsahir	Laki-Laki	40	02	02	jalur pipa	Tamat SD	Petani	dagang	3	1.700.000	566.667
5	Anus	Imur	Perempuan	36	01	01	jalur pipa	Tamat SD	Petani	wirausaha kerajinan keranjang	5	2.800.000	560.000
6	Andi	Wilda Arisami	Perempuan	34	02	02	bukan jalur pipa	Tamat SLTA	Wirausaha		4	2.000.000	500.000
7	M Efendi	Tina	Perempuan	32	02	01	jalur pipa	Tamat SLTA	Supir		2	1.000.000	500.000

Kuala Gasib Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Bahtiar	Idris	Laki-Laki	42	02	02	jalur pipa	Tamat SLTP	Wirausaha	Bertani	3	2.000.000	666.667
2	Zulkifli	Zulkifli	Laki-Laki	25	02	02	jalur pipa	Tamat SLTA	Buruh		3	2.300.000	766.667
3	Sunardi	Dahlia	Perempuan	35	02	03	bukan jalur pipa	Tamat SLTP	Petani		3	1.800.000	600.000
4	Arif Surachman	Arif Surachman	Laki-Laki	33	03	03	bukan jalur pipa	Sarjana	Petani	pedagang	5	3.500.000	700.000
5	Mugo Ruswandi	Mugo Ruswandi	Laki-Laki	60	03	03	jalur pipa	Tamat SLTA	Petani		3	1.400.000	466.667
6	Maulana Ramadhan	Susi Rahayu	Perempuan	20	03	03		Tamat SLTP	Supir		3	1.700.000	566.667
7	Isu	Tatik	Perempuan	35	02	02	jalur pipa	Tamat SD	Petani		4	3.100.000	775.000
8	Zainal Effendy	Andi	Laki-Laki	20	02	02	jalur pipa	Tamat SLTP	Karyawan Swasta	bertani	7	5.000.000	714.286
9	Bahman Pohan	Yenita Meri	Perempuan	41	03	03	jalur pipa	Tamat SLTA	Buruh	-	8	4.700.000	587.500

APPENDIX 03

RESPONDENT'S DATA ON MIDDLE INCOME FAMILY

Kelurahan Melebung

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Turino	Marsi	Laki-Laki	67	01	01	jalur pipa	Tamat SD	Buruh		2	2.000.000	1.000.000
2	Muhammad Ewin	Muhammad Ewin	Laki-Laki	29	02	01	bukan jalur pipa	Tidak Tamat SD	Buruh		4	3.500.000	875.000
3	Agus Salim	Agus Salim	Laki-Laki	54	02	01	bukan jalur pipa	Tidak Tamat SD	Buruh	petani	3	2.650.000	883.333
4	Nazri	Marti	Perempuan	34	01	02	bukan jalur pipa	Tamat SLTP	Petani	petani	4	3.400.000	850.000
5	Ariyono	Masriati	Perempuan	30	01	01	bukan jalur pipa	Tamat SD	Buruh		4	5.400.000	1.350.000

Kampung Meredan

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Bukhori	Puninten	Perempuan	44	03	01	jalur pipa	Tamat SD	Karyawan Swasta	berdagang	5	5.300.000	1.060.000
2	Supriyadi	Sumasriyani	Perempuan	35	01	02	jalur pipa	Tamat SLTP	Buruh	dagang	5	5.000.000	1.000.000
3	Ahmad	Rosnita	Perempuan	70	02		bukan jalur pipa	Tidak Tamat SD	Wirausaha	-	2	2.500.000	1.250.000
4	Ngah Dikin	Sarifah Aini	Perempuan	45	01	01	bukan jalur pipa	Tamat SLTA	Wirausaha	dagang	3	4.500.000	1.500.000
5	Erisno	Erisno	Laki-Laki	36	01	02	jalur pipa	Tamat SLTA	Petani	SPTI	3	3.500.000	1.166.667

Kampung Pinang Sebatang

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Jumanto	Zuraida	Perempuan	27	03	03	bukan jalur pipa	Tamat SLTA	Petani		3	2.700.000	900.000
2	Awi	Awi	Laki-Laki	39	02	05	jalur pipa	Tidak Sekolah	Penebang atau pemotong kayu	dagang	4	5.700.000	1.425.000
3	Rambat	Rambat	Laki-Laki	43	12	04	jalur pipa	Tamat SD	Wirausaha		3	3.000.000	1.000.000
4	Januar	Januar	Laki-Laki	31	03	05	jalur pipa	Sarjana	Pedagang		3	3.000.000	1.000.000
5	Reswandi	Martianis	Perempuan	48	03	05	bukan jalur pipa	Tamat SD	Petani		6	6.300.000	1.050.000
6	Rudianto	Siti	Perempuan	43	03	05	jalur pipa	Tamat SLTP	Petani	dagang	3	3.700.000	1.233.333
7	Darman	Susan	Perempuan	43	03	05	bukan jalur pipa	Tamat SLTP	Petani		5	6.000.000	1.200.000

Kampung Tualang Timur

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	M Arifin	M Arifin	Laki-Laki	31	01	01	jalur pipa	Tamat SLTA	Pedagang	-	4	6.150.000	1.537.500
2	Chandra Darusman	Deimita	Perempuan	22	01	02	jalur pipa	Tamat SD	Petani	dagang	3	4.000.000	1.333.333
3	Rahmat Ramadhan	Rahmat Ramadhan	Laki-Laki	24	01	05	bukan jalur pipa	Tamat SLTA	Wirausaha	bongkar muat kapal	4	3.500.000	875.000

Kampung Kuala Gasib

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Suharno	Suharno	Laki-Laki	47	02	02	jalur pipa	Tamat SLTA	Wirausaha	Bertani	4	4.700.000	1.175.000
2	Karsum	Karsum	Laki-Laki	53	03	03	jalur pipa	Tamat SD	Petani		4	3.600.000	900.000
3	Budiman	Budiman	Laki-Laki	32	03	03	bukan jalur pipa	Tamat SLTA	Karyawan Swasta		4	4.100.000	1.025.000
4	Kadim	Sutrisni	Perempuan	49	03	03	jalur pipa	Tamat SLTP	Petani		6	5.000.000	833.333
5	Rasul	Rasul	Laki-Laki	51	02	02	jalur pipa	Tamat SD	Petani	6	4	6.300.000	1.575.000
6	Rasimin	Ema	Perempuan	34	03	03	jalur pipa	Tamat SD	Petani	-	3	2.500.000	833.333

APPENDIX 04

RESPONDENT'S DATA ON RICH FAMILY

Melebung Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Syamsir	Syamsir	Laki-Laki	56	01	01	bukan jalur pipa	Tamat SD	Petani		4	12.200.000	3.050.000
2	Firdaus	Firdaus	Laki-Laki	60	04	01	bukan jalur pipa	Tamat SLTA	PNS	tani	3	5.500.000	1.833.333

Meredan Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Mishar	Mishar	Laki-Laki	45	02	02	bukan jalur pipa	Tamat SLTA	Petani	dagang	3	8.200.000	2.733.333
2	Herman	Herman	Laki-Laki	53	02	02	bukan jalur pipa	Tamat SLTP	Petani	depot air	7	22.333.333	3.190.476
3	Eko Susilo	Reni Lestari	Perempuan	35	01	03	bukan jalur pipa	Sarjana	PNS	bertani	4	8.000.000	2.000.000
4	Arjun	Wirda	Perempuan	26	01	02	bukan jalur pipa	Tamat SLTP	Supir	-	4	7.500.000	1.875.000

Pinang Sebatang Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Jamir	Jamir	Laki-Laki	43	02	05	jalur pipa	Tamat SLTA	Pedagang	Berkebun sawit	6	18.400.000	3.066.667
2	Gendut	Suharsinati	Perempuan	47	03	05	jalur pipa	Tamat SD	Petani	bantu istri jualan	3	5.500.000	1.833.333
3	Sarjan	Sarjan	Perempuan	60	03	05	bukan jalur pipa	Tidak Tamat SD	Petani		3	5.000.000	1.666.667
4	Muriyadi Wagirun	Muriyadi Wagirun	Laki-Laki	76	02	04	jalur pipa	Sarjana	Pensiunan		2	4.500.000	2.250.000

Tualang Timur Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	E Tambunan	E Tambunan	Laki-Laki	56	01	01	jalur pipa	Tamat Akademi/D3	Petani	Di toko	6	10.000.000	1.666.667
2	Bungaran	Nurida	Perempuan	43	01	02	jalur pipa	Tamat SLTA	PNS		4	6.500.000	1.625.000
3	Sirait	Sirait	Laki-Laki	55	01	02	jalur pipa	Tamat SLTA	Petani		4	8.000.000	2.000.000
4	Sawaluddin	Ernawati	Perempuan	47	01	01	jalur pipa	Tamat SLTP	Wirausaha		3	7.000.000	2.333.333
5	Robinson Butar Butar	Robinson Butar Butar	Laki-Laki	39	02	02	jalur pipa	Tamat Akademi/D3	Petani		6	11.800.000	1.966.667

Kuala Gasib Village

No	Family Head Name	Respondent's Name	Sex	Age	RT	RW	Chategory	Education Level	Main Livelihood	Sideline Livelihood	Family Members #	Revenue	Revenue per capita
1	Samsul	Masjelita	Perempuan	35	03	03	bukan jalur pipa	Tamat SD	Petani		5	9.000.000	1.800.000
2	Sanusi	Nautir	Perempuan	42	03	03	jalur pipa	Tamat SLTP	Petani	satpam, menjaga lahan	3	5.000.000	1.666.667

APPENDIX 05

MONITORING DATA ON INFRASTRUCTURE

Village : Kuala Gasib
Sub-district : Koto Gasib

No	Monitorinng Object in Kuala gasib	Good (x)	Bad (x)	Remarks
1	Road	X		Main road is asphalt, village strret is cement.
2	Public Road Lighting		X	
3	Water drainage (trench)		X	Not Available
4	Waste Container Facility		X	Not Available
5	Public transportation Service (Buses, shared taxi, motorcycle taxi etc)	X		Intercity Bus
6	Public transportation condition (Buses, public transportation, motorcycle taxi etc)	X		
7	Bus stop/ Sub terminal		No	
8	Electricity condition (frequent power outage or not)		x	Often no electricity, just installed on February 2018.
9	People who has no electricity service	Yes	No	If yes, the number of family head that has been without power
10	Water Company		No	
11	Village Clean Water Facilities/Pipeline	Yes		Drilled Well construction in 3 RT of Sukamaju Hamlet
12	Clean water service (Water Company or other)		No	
13	Sellular Phone Signal (name the service operator)		x	Mostly using Telkomsel
14	Cable phone		No	
15	Sport Facilities Mention :	Yes		Badminton court Volleyball court
16	Park atau Open Green Space	Yes	No	
16	Market	Yes		Thursday In the village
17	Cooperation	Yes		Near Village office Save and loans by Bumkampung
18	Bank/BPR		No	Dsitance from village

APPENDIX 06

QUESTIONER OF HOUSEHOLD SOCIO-ECONOMIC SURVEY

QUESTIONER OF SOCIO- ECONOMIC SURVEY
TENAYAN SGPP GAS PIPELINE PROJECT YEAR 2018

No. Respondent ☐☐☐

Enumerator Introduction:

Thank you for your willingness to have a chat with us today in regard of your household's social economic condition. The purpose of this interview is to understand the community's social economic condition which might be impacted by the Tenayan Steam & Gas Power Plant (SGPP) Project. The information that we want to know in this interview is about the community's profile and its characteristic. We have prepare several questions about your household profile, your income and expenditures, and your home situation.

We will keep the secrecy of all the questions and information given, and we will not share them to the public or your neighbours. Your answers will only be used for this project to have deeper understanding about your environment condition and to help us giving the best and adequate suggestions in order to achieve the best result for the community with the existence of Tenayan SGPP Project.

In the end of this questioner, we will ask you to sign this questioner page as a sign that you have participated in this valuation consciously and without coercion and had provided actual information as far as you can remember.

Thank you for your coorperation. Let's start.

INTERVIEWER IDENTITY (ENUMERATOR)

Enumerator Name :_____

Enumerator Signature :_____

INTERVIWE TIME AND LOCATION

District Name:_____ Sub-district : _____

Village :_____ Hamlet : _____

RT/RW (RK) :_____

Interview Date (Day/Month/Year) : ☐☐/ ☐☐/ ☐☐

Time : ☐☐:☐☐

_____

___

Supervisor Verification Name:	Respondent's Verification Name:

A. RESPONDENTS IDENTITY:	
1	Household Head Name/ Respondent : ……
2	Sex : Male / Female
3	Age : ……. Years Old
4	Responden Cell Number (family member) :
5	Religion/ faith : a. Catholic b. Christianity c. Islam d. Hinduism e. Buddhism f. Other ……..

6	Since when You have been living in this village / region ? a. Since birth b. less than 1 year c. >1-5 years d. 5 – 10 years e. > 10 years What is your ethnic group ? a. Malay b. Minangkabau c. Batak d. Javanese e. Bugis f. Other : ……..
7	Family members number in one household (whose under the Family Head responsibility) : …….. people

No	Family Member Name	M /F	Age	Family Relation	Status	Education	Employment	Chronic Illness Suffered
1								
2								
3								
4								
5								
6								
7								
8								

B. HUMAN RESOURCES

8	Last Education of Mr/ Mrs (respondent) 1. No School 2. Not Completing Primary 3. Finished Primary 4. Graduated Junior High Graduated High school 6. Graduated Academy 7. Bachelor 8. Postgraduate
9	Main Livelihood (Family Head): 1. Civil Servant 2.Employee 3.Honoratory 4 Merchant 5. Labor 6. Driver 7. Fishermen 8. Farmer 9. Armed Forces/ Police 10. Entrepeneur (craftsmen/ home industry 11.Others (specify)…… Side Livelihood : ……
10 a	What skills Mr/ Mrs (family Head) have that can support economic activity? ☐ Farming ☐ Mechanic ☐ Carpentry and Stonemason, ☐ Electricity, ☐ Fishing ☐ Trade ☐ Driver ☐ taxibike ☐ tailor ☐ Other.....
10 b	What additional skills you (Respondent) have that can support economic activity? ☐ Farming ☐ Mechanic ☐ Carpentry and Stonemason, ☐ Electricity, ☐ Fishing ☐ Trade ☐ Driver ☐ taxibike ☐ tailor ☐ Other .....

11 a	Where do you (Family Head) learn the above mentioned skill? 1. Learn on my own (Self-taught) 2. Take a course 3. Government Program 4. NGO. 5. From generation to generation 6. Company Training Program 7. Other. Explain ……..
11 b	Where do you (Respondent) learn the above mentioned skill? 1. Learn on my own (Self-taught) 2. Take a course 3. Government Program 4. NGO. 5. From generation to generation 6. Company Training Program 7. Other. Explain ……..
12	What are your (Mr/ Mrs) daily activities ?

Time	Husband	Wife
Morning	…… ……	…… ……
Noon	…… ……	…… ……
Afternoon	…… ……	…… ……
Night	…… ……	…… ……

13	How many time you have a meal in one day? 1. Once 2. Twice 3. Thrice

C. NATURAL RESOURCES

14 a	Land Area Owned : ……Ha./……M^2/ Local Measurement : .....Conversion factor
14 b	Land Area Cultivated : ……Ha./……M^2/ Local Measurement : .....Conversion factor
15	Cultivated Land Status: 1. Individual property 2. Parent-owned 3. Rental 4. Customary Land 5. Community owned/shared/village owned land 6. Others : ……
16	Land Utilization Table

Type of Plants	Rubber	Oil Palm	Other ……	Other ……..	Other ……..
Planted area (Ha/M2)					

Annual Harvest Quantity:	Kg	Kg	Kg	Kg	Kg
Price per Kg.	Rp	Rp	Rp	Rp	Rp

Where the agricultural products are sold to?

☐Neighbour ☐Local/ village market ☐Middleman ☐Collector Merchant

☐Other, Explain .....

17 Please list the number of farm animals that you have :*Use the table below to fill it*

Type of Animal Farm	**Cow**	**Goat**	**Chicken**	**Duck**	**Others ……..**
Number (head) :					
Selling Price/ head:	Rp	Rp	Rp	Rp	Rp
Annual sold number/ Head:					

Where the farm animal are sold to?

☐Neighbor ☐Local/ village Market ☐Middleman ☐Collector Merchant

☐Others, Explain.....

18 List the number of fishery/ river products that you earn per day :

Use the table below to fill it

Type of animal	Fish ……	Fish ……	Fish ……	Fish ……	Others ……
Number (Kg.) :	Kg	Kg	Kg	Kg	Kg
Selling Price/Kg :	Rp	Rp	Rp	Rp	Rp

Where the fisheries are sold to:

☐ Neighbor ☐ Local/ village Market ☐ Middleman ☐ Collectorl Merchant

☐ Others, Explain.....

How many times in a year harvesting (cultivated)? Explain :……

How many days in a week fishing inn the river? (Capture fisheries) Explain .....

D. PHYSICAL RESOURCES

19 Home Ownership Status:

Private Property 2. Parent-owned 3.Lease 4. Free stay

20 **a.** Land Area Owned : ……Ha./……M^2/ Local Measurement : .....Conversion factor

b. Land Area Owned : ……Ha./……M^2/ Local Measurement : .....Conversion factor

21 Home Building Condition :

a. Roof : 1. Zinc 2. Roof tile 3. Asbestos 4. Sago palm
b. Wall : 1. Brick 2. Plank 3. Woven bamboo 4. plywood
c. Flooring : 1. ceramic 2. cement 3. board 4. dirt

22 When was your house was built (including the Bath-wash-toilet facility)?

1. Built year: House..... 2. Bath-wash-toilet.....

Home building source of funds :

.....

23 How many people/ family members live in your house?

Explain.....

24 How is your house condition in regard of:

1. Air Circulation : a. available b. not
2. Lighting: a. good b. moderate c. bad

25 What are the goods available in your house?

1. Television : a. available b. not
2. Fixed Phone : a. available b. not
3. Internet Network : a. available b. not
4. Refrigerator : a. available b. not
5. Bed/springbed : a. available b. not
6. Sofa/Living room set : a. available b. not
7. Dining Table : a. available b. not
8. Gas Stove : a. available b. not

26 Should you have other buildings for trading or service business, what is the annual income value from the business?

Use the table below to fill it

Building for trading table

Building for trading and/ or service	Small Shop	Store	Boarding House	Hut	Others
Building condition *)					
Ownership status **)					
Income /year (Rp)					

*) Building condition: permanent (brick), semi permanent (brick and wood),

**) Ownership status: private property/ shared owned with family/ shared owned with other

27 Family source of lighting:

1. Nation Electricity Company (PLN) 2. Oil Lamp 3. Generator set 4. Village's generator set desa 5. Electricity/ Generator set joining the neighbor

28 Drinking Water Source : 1. PDAM 2. Well 3. Mineral water/galon 4. Rain water

29 Is your household have privately owned vehicle?

No	Type	Amount
1	Bycicle	
2	Motorcycle	
3	Car	
4	Truck	
5	Boat	

Other: .....

30 In the absence of private vehicle, what kind of public transportation your family uses for family activites ?

1. Shared taxi 2. Motorcycle taxi 3. Trans Metro Pakanbaru (city bus) 4. Others…..

31	Is you family member (responden) using cellphone? 1. No 2. Yes how many……
E. FINANCE RESOURCES	
32	Do you have income from : a. trading : 1. Yes 2. No If yes, how much is your monthly omzet? Rp..... b. Monthly salary : 1. Yes 2. No If yes, how much is your monthly salary? Rp..... c. Allowance from children/ family : 1. Yes 2. No If yes, explain the source……..and, how much is your monthly allowance? Rp..... d. Pension Fund : 1. Yes 2. No If yes, how much is your monthly pension fund? Rp..... e. Other: 1. Yes 2. No If yes, explain the source …….. and, how much is your monthly income? Rp.....
33	What is the average amount of your family income monthly? a. < Rp 500.000 b. Rp 500.000 - 1.000.000 c. Rp 1.000.000 -2.500.000 d. Rp. 2.500.000 – 5.000.000 e. Rp. 5.000 – 10.000.000 f. >Rp. 10.000.000
35	What is the average expenditure amount monthly? Answer Rp : …….
36	Compared to last year, how is your income this year? a. Increase b. Decrease Explain the reason: …….
37	Is the income covers your family daily needs? a. Yes b. No Explain the reason : ……
38	What are the problems that your family have? Answer : ……..
39	In what form that usually you received help/ loan? Answer : ……..
40	Do you have any bank account? 1. Yes. 2. No

41	How much is your family average expense monthly: 1. Rice : Rp. ..... 2. Side dish and vegetables : Rp. ..... 3. Electricity : Rp. ..... 4. Education : Rp. ..... 5. Transportation : Rp …….. 6. Health/ BPJS : Rp …… 7. Recreation/Entertainment : Rp …….. 8. Communication : Rp …….. 9. Business capital : Rp. ..... 10. Cigarette : Rp. ..... 11. Others : Rp. ..... **Total : Rp. .....**
42	Should you need emergency fund, where do you usually borrow it? (Answers canbe more than 1) 1. Bank 2. Relative 3. Neighbor 4. Corperation 5. Loan shark 6. Other. Explain... What is the loan is used for?.....
F. SOCIAL RESOURCES	
43	Is there mutual assistance/ cooperation conducted in this region for the environment ? 1. Yes 2. No If yes, how is your participation in mutual assistance: 1. Once a year 2. Twice a year 3. Seldom 4. Never
44	What are the community activities that the people of this region actively do? 1. Arisan (Regular Social Garthering) a. Yes b. No 2. National Holiday Celebration a. Yes b. No 3. Posyandu 4. Posyandu for elderly 5. Others.....
45	What are the socio-religious activities that the people of this region actively do? 1. Pray and Quran Recital a. Yes b. No 2. Religion holiday celebration a. Yes b. No 3. Others.....
46	Where the people are receiving information of agriculture, health service, job opportunity, etc from? 1. Announcement Board 2. Brochure 3. Radio 4. Television 5. Social Media 6. Internet 7. Society figures 8. Others, specify : ……
47	a. Do you involve in an organization or social group ? 1. Yes 2. No b. If yes, what is the type of the organization ? 1. Youth/ Student 2. Religious 3. Etnicity 5. Profesion 6. Hobby 7. PKK

	c. What is your position in the organization ? Answer : …….. d. How is your participation level ? 1. Less Active 2. Aktive 3. Very Aktive e. Is there any benefit that you receive from the organization/ social group that you joined in? 1. Yes 2. No f. Explain the reason : …… ……
G. COMMUNITY'S HEALTH AND EDUCATION	
48	What do you do if there a family member who was ill? 1. Give them medicine/ herbal medicine bought at the small shop/ medicine shop 2. Get treatment from medical personnel 3. Get treatment from witchdoctor/ healer 4. Other (specify) …….. Reason : …… …….. ……..
49	Is your family have health insurance : 1. yes, specify…… 2. no
50	What is the community's opinion about health facilities service (puskesmas, pustu, polindes, clinic, etc) 1. good 2. moderate 3.bad
51	How is the schools' condition that exist in the village/ sub-district area (physical building) : 1. good 2. moderate 3.bad
52	Are the parents were charged for : a. Entrance fee/building 1. Yes 2. No If yes, how much Rp…… b. Uniform 1. Yes 2. No If yes, how much Rp …….. c. Books 1. Yes 2. No If yes, how much Rp …….. d. Monthly tuition 1. Yes 2. No If yes, how much Rp …….. *) the costs is the average total per month of each cost item
H. ENVIRONMENT SANITATION CONDITION	
53	Family bathing and toilet facility: 1. Family's Bathroom 2. Public Bath 3. River 4. Anywhere
54	Household Garbage Management: 1. Taken by Sanitary Officer 2. Burn 3. Thrown into the river 4. Thrown anywhere 5. Other: ……
55	Household liquid waste management: 1. Made waste water drainage/ septictank 2. Channeled to the sewer 3. Channeled to the river 4. Other

56	List the environmental hazard that often occur: 1. Flood 2. Earthquake 3. Landslide 4. Fire 5. Other: …….. 6. Nothing
I. LOCAL CUTURAL CONSERVATION AND ACTIVITY	
57	Was there any tradition/ cultural/ faith activity that often celebrated in your environment? 1. Yes 2. No
	If yes, explain those cultural activity • The tradition of welocoming the month of Ramadhan (petang megang) • The tradition of misfortune • The tradition of mutual assistance in building home • The tradition of mutual assistance in wedding/ circumcise events • The tradition of mutual assistance of business (batobo)
58	Were there any cultural grave/ site/ relic in your environment? 1. Yes 2. No If yes, specify name and location_____**(Take GPS location and Photo)** If yes, specify name and location _____ _____**(Take GPS location and Photo)** If yes, specify name and location _____ _____ _____**(Take GPS location and Photo)**
J. COMMUNITY'S PRECEPTION	
59	According to your opinion, is this village in general a peaceful or colored by violence place? a. Very peaceful b. Somewhat peaceful c. Less Peaceful, somewhat colored by violence d. Full of violence
60	How secure do you feel when walking alone at night? a. Very secure b. Somewhat secure c. Less Secure d. Not secure
61	What is your opinion about security disturbance (thievery, murder, rape, robbery, etc) in this village in general: a. High b. Moderate c. Low
62	According to you, was there any land ownership conflict in this village? a. Yes b. Never
63	If there were any land conflict occurred, who were involved? a. Within the villagers b. Villagers *VS* Other villagers c. Villagers *VS* the company d. The company *VS* government

64	If there any land conflict, who was usually settle it? a. Village official b. Custom leader c. Religious figure d. Discussion between the dispute parties help by local public figures e. Discussion between the dispute parties help by village officials f. Respected community's member g. Others, ……
65	If often/ seldom, fight/ conflict with: a. Neighbor b. Other ethnic c. Immigrants d. Company
66	What is the cause of the fight/ conflict? a. Material seizing b. Land seizing c. Breaking local tradition d. Hostility from generation to generation e. Juvenile delinquency f. Village border conflict g. Others…….
67	Who is usually the first settling the fight/ conflict? a. Village Head and its officials b. Settled by the community c. Custom Leader d. Law officer e. Kinship f. Respected community's member (L/P)
68	If there any conflict/ dispute, how is the settlement mechanism? a. Personally settled b. Settled by custom leader c. Settled by village officials d. Settled with village discussion e. Law officer involvement
69	Do you know that there will be a Riau **Steam & Gas Power Plant** (SGPP) / **Gas pipeline** construction activity in this area? a. Yes b. No
70	If you know, From whom the information was acquired? a. District's civil servant b. Sub-district's official c. Village official d. Friend e. Newspaper/ radio f. Socialization from the company through the public consultation g. Other information…….

71	In your opinion, is the **SGPP/ gas pipeline** construction was beneficial for the community? a. Very beneficial b. Beneficial c. Harmful d. Very harmful
72	Pick one or all of the below reason, which of the following is true if you say **SGPP/ gas pipeline** are **beneficial :** a. Can make job opening for local people around the SGPP construction location. b. Not harming the people who lost their job because the initiator will think of the job that can replace the livelihood source. c. Opening business opportunity for surrounding people around the SGPP construction location. d. Can help for village development around the SGPP/ gas pipeline construction location. e. There is a CSR program from the company that is well planned and right on target which will elevate local community's welfare at around the SGPP construction. f. Helping filling the regional electricity needs. g. Other:
73	Pick one or all of the below reason, which of the following is true if you say **SGPP/ gas pipeline harmful** : a. Using productive fishpond area for SGPP project / gas pipelineconstruction will reduce/ disturb people livelihood. b. Land owners and lots of farm labors will lose their livelihood. c. SGPP activity will cause environmental pollution so it can harmful for the community.
74	How is your position on the **Riau SGPP / gas pipeline** construction plan? 1. Agree, explain…….. 2. Not Agree,explain……..

H. CLOSING

Is there any suggestion or other issues that you want to share in this opportunity? Please explain to us :

.....
.....
.....
.....
.....

If there is no other things that need to say in this opportunity, we on behalf of Survey Team are grateful for your time and information that you have given. Those information are very valuable for the Team to do some assessment necessary. We also apologized should there are any action or words from us that less than acceptable with local culture during our stay and interview sessions. THANK YOU.

APENDIX 07

SOCIO-CULTURAL STUDIES QUESTIONING GUIDE

QUESTIONING GUIDE ON IMPLEMENTATION OF
SOCIAL CULTURAL STUDY
TENAYAN SGPP GAS PIPELINE PROJECT

A. SOCIAL ASPECT

1. *Nature and Social Environment Planning Pattern*
   How is the local people act in the case of land division and environment (for Housing, farming and agriculture, forestry, communally held land, public cemetery, herding field and others).

   If there is communally held land, who is that have the right to arrange and manage it?

2. *Land Ownership Structure for People*
   a. How local custom works for land inheritance regarding its ownership and using rights?
   b. On average how much of land area owned by one household?
   c. Whatever the uses for each land owned by each household?
   d. From the family land use, what will they do with their earned money?
   e. Is there any change to the land area in the terms of ownership and usability for the time being?
   f. If there are changes, what kind of changes happened and what was causing it?

3. *Public Social Structure*
   a. How each individual position arranged in community by the custom applied here?
   b. What is the rights and obligations for each individual according to their position on their applied custom?
   c. What are the special rights bestowed to the leader according to the custom? (in the context of authority (Power), special rights (Privilege), and dignity (Prestige)on society)
   d. Explain each share of rights and obligations between man and women as it arranged by their custom? (On the terms of work share in the house and in the field, on the management of wealth and land, on inheritance cases, on decision making inside family and society).
   e. Is there any change on individual position in society caused by changes in education level?
   f. Is there any change on individual position in society caused by changes in income level?
   g. Is there any change on individual position in society caused by changes in occupation?
   h. Is there any change on individual position in society caused by changes in religion?
   i. Is there any change on individual position in society caused by changes in living location etc.?

4. *Society*
   a. What kind of Social Society Organization currently exists on the area? (Formal and informal society organization, such as political party, community organization, youth organization, family development program, local party, etc.)
   b. What kind of activity does each organization have?

c. Where is the location of their secretarial office? (In the village, district, regency,province).
d. How is the position for custom and culture in Melayu Riau? And how well the relationship between custom law and Islam?

5. *Inter-Social Group Relationship Pattern*
   a. How well the relationship between each member of society? (Relationship between villages, between religion groups, between social organizations, between ethnic groups).
   b. How well relationship been managed between society members in the context of internal relation and external relation with the people from outside of the village.

6. *People Mobility and Migration Pattern*
   a. From which area does the person choose to marry?
   b. Where they usually stayed after they married?
   c. Which location does they prefer to work, school or make shift and what are their reasons?
   d. Where they usually travels, what for and how long?
   e. What means of transportation that they used for traveling?

B. CULTURAL ASPECT

1. Identify the daily language used by the people.

2. Identify the meaning of land ownership for individuals and village community.

3. How they identify themselves as a social group which is different from other social groups(from language, origin, heredity, tradition, etc).

4. Identify the settlers group that lived on study location (their origin, historical background, number of population, acquitted economic field, religion embraced, social cohesion level and group solidarity, relationship pattern developed with the locals).

5. Identify the Cultural Values and Public Social Regulations
   What kind of cultural values and regulations exist in the society? (In the context of family and relatives relationship, cohabitation, work share, land, forest and water management).

6. Tradition
   What kind of tradition applied and what are their function? (In marriage, birth, death and custom ritual)

7. Cultural Heritage Site
   What cultural sites exist in this area that considered important and sacred by the community (ancestor graves, sacred places and holy, site with historical importance,objects, animal, trees that considered holy/sacred).

8. Cultural Changes
    a. Is there any change lately regarding cultural value appliances, custom regulations, norms and in the practice of traditional ceremony?
    b. If there are changes in culture, what was the background cause?(Does the reason why is related to the project activity).
    c. What also the repercussions experienced by the people in regards of that cultural changes?

9. The Project impact against social and cultural well-being.
    a. If the Tenayan project doing their activity, will it become hindrance for the people nearby to make ends meet for their family? (Explain the reasons).
    b. How the people respond to migrant workers? Does the memory about conflict affect the people's perspective on migrant workers.

APPENDIX 08

OBSERVATIONS AND INTERVIEWS GUIDANCE OF INFRASTRUCTURE AND ECONOMIC ASPECT

OBSERVATION AND INTERVIEW GUIDANCE

Village Infrastructure and Economy Aspect : .....

Sub-district : .....

No	Observation Object	Good (x)	Bad (x)	Remarks
1	Road			Road Condition (asphalt, bricks, gravels, dirt) Road's Length and Width
2	Public Road Lighting			
3	Water drainage (trench)			
4	Waste Container Facility			Garbage Picked-up Schedule
5	Public transportation Service (Buses, shared taxi, motorcycle taxi etc)			If available, the number of fleet data
6	Public transportation condition (Buses, public transportation, motorcycle taxi etc)			
7	Bus stop/ Sub terminal			
8	Electricity condition (frequent power outage or not)			
9	People who has no electricity service	Available	Not Available	If available, the number of Family Head that don't have power yet
10	Water Company	Available	Not Available	
11	Village Clean Water Facilities/Pipeline	Available	Not Available	
12	Clean water service (Water Company or other)			

No	Observation Object	Good (x)	Bad (x)	Remarks
13	Sellular Phone Signal (name the service operator)			
14	Cable phone	Available	Not Available	
15	Sport Facilities Mention :	Available	Not Available	
16	Park atau Open Green Space	Available	Not Available	
16	Market	Available	Not Available	Market day schedule Distance from village
17	Coorperation	Available	Not Available	Distance from village
18	Bank/BPR	Available	Not Available	Distance from village

APPENDIX 09

COMMUNITY'S HEALTH QUESTIONING GUIDE

Secondary Data

Public and Environment Health Aspect

Village : .....

Year :.....

Village : .....

No. of Villagers : .....inhabitant

No. of Hamlet : .....village / hamlet

No. of Household : .....household

No	Data Type	Quantity	Information
1	10 biggest disease data from local healthcare units (poskesdes/polindes) 1..... 2..... 3..... 4..... 5..... 6..... 7..... 8..... 9..... 10.....	.....pers	Mention the name of the diseases and number of patients
2	SARANA layanan kesehatan yg Available di Village : ▪ Puskesmas, (Public health Centre) ▪ Puskesmas Pembantu, (Subsidiary Puskesmas) ▪ Poskesdes/Polindes, (Village Health Post) ▪ Posyandu (Integrated Service Post) ▪ Posyandu for Elderly ▪ Others (specifiy……)	.....unit .....unit .....unit .....unit .....unit	
3	Medical worker that available in the village: ▪ General Practitioner, ▪ Nurse, ▪ Midwife, ▪ Midwife Aide,	……. pers .....pers .....pers .....pers	Doctor visit 2times a week

No	Data Type	Quantity	Information
	▪ Tocologist Healer ▪ Others (mention.....)	.....pers .....pers	
4	The number of people joined Health Insurance ▪ BPJS ▪ Jamkesmas/Jamkesda ▪ KIS ▪ Other insurance	 .....pers .....pers .....pers .....pers	
5	People's access to clean water : ▪ Dug Well / Hand Pump ▪ Piping of Protected Water Source, ▪ Piping System from River ▪ Rivers / Pools ▪ Rainwater Reservoir ▪ State Owned Piping System (PDAM) ▪ Others (mention.....)	 …… % …… % …… % …… % …… % …… % ……%	Questioned to every hamlet
6	Community access to lavatory: ▪ Family Water Closet ▪ Garden / Open Field ▪ River / Gutter / Pond ▪ Others (mention.....)	 ……. % ……. % ……. % …….%	Questioned to every hamlet
7	Villagers habit for garbage disposal: ▪ Burned, ▪ Thrown into the field, ▪ Throwninto the river or gutter, ▪ Processed into fertilizer, ▪ Others (mention……..)	 …… % …… % …… % …… % ……%	Questioned to every hamlet
8	Villagers habit for sewage disposal: ▪ Well / catchment channel ▪ River / gutter ▪ As they please ▪ Others	 …… % …… % …… % …… %	
9	Baby nourishment status from weigh-in data: ▪ Good nourishment: ▪ Medium to malnourished: ▪ Malnutrition: ▪ Number of babies:	 …… child …… child …… child …… lives	Questioned to every hamlet
10	Vector density (mosquito)	dense/ no	Asked to the community
11	Vector density (fly / house-fly)	dense/ no	Idem

APPENDIX 10

EDUCATION QUESTIONING GUIDE

Secondary Data

Community Education Aspect

Sub-district : .....

Year:.....

No	Data Type	Number	Remarks
1	Number of School • PAUD (Playgroup) • TK (Kindergarten) • SD (Elementary) • SMP (Junior High) • SMA (High school) • Other, Specifiy :		
2	Number of class locally • PAUD (Playgroup) • TK (Kindergarten) • SD (Elementary) • SMP (Junior High) • SMA (High school) • Other, Specifiy ::		
2	Number of Teacher • PAUD (Playgroup) • TK (Kindergarten) • SD (Elementary) • SMP (Junior High) • SMA (High school) • Other, Specifiy ::		
3	Number of Student • PAUD (Playgroup) • TK (Kindergarten) • SD (Elementary) • SMP (Junior High) • SMA (High school) • Other, Specifiy ::		
4	Community's Data Based on Education Level		

No	Data Type	Number	Remarks
	(attached) • Village : • Village : • Village : • Village : • Village : • Village : • Village : • Village :		
5	Data Penduduk Usia Sekolah (terlampir) • Village : • Village : • Village : • Village : • Village : • Village : • Village : • Village :		
6	Data Penduduk Putus Sekolah (terlampir) • Village : • Village : • Village : • Village : • Village : • Village : • Village : • Village :		

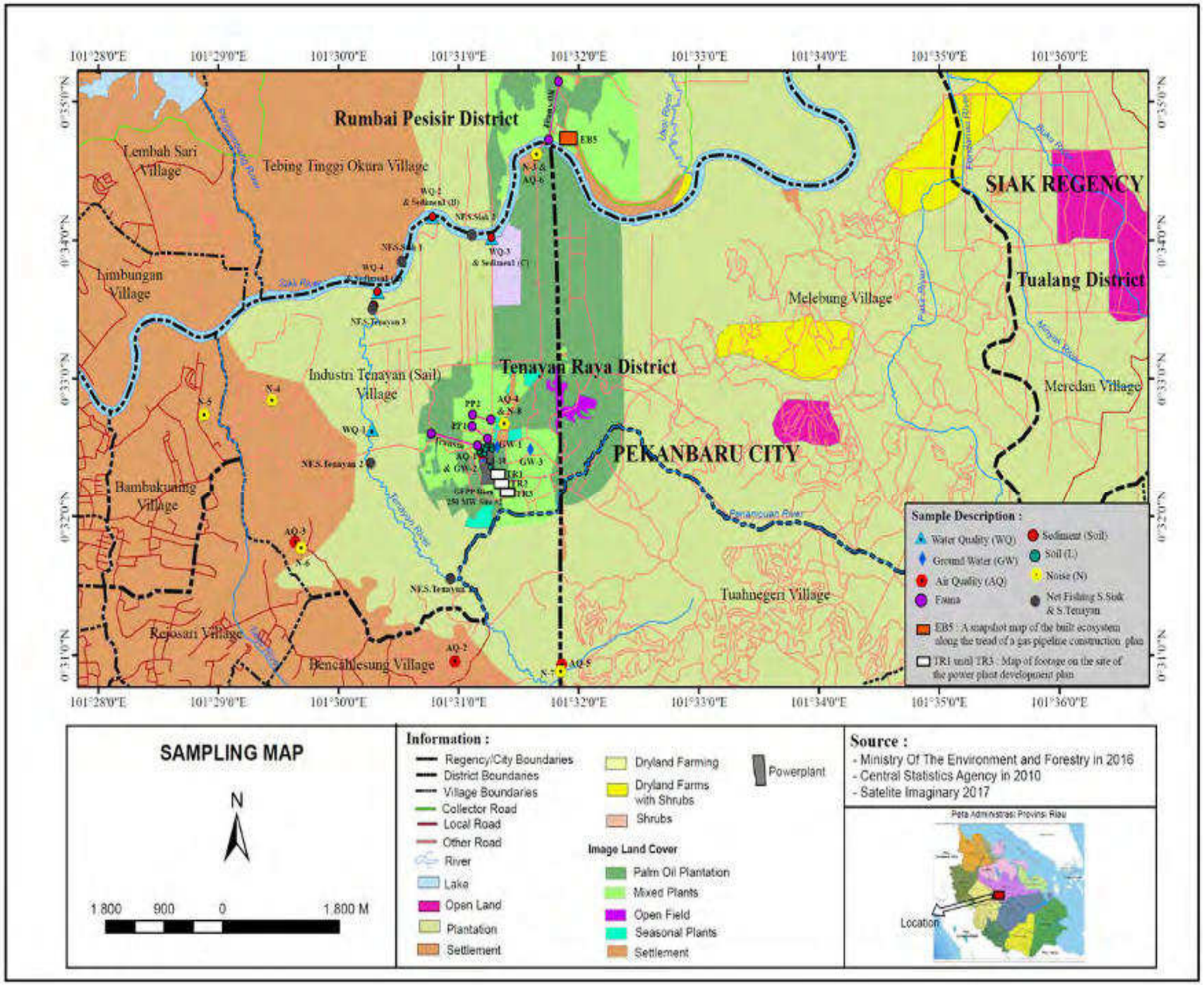

Figure 10-1. *Sampling Location Map*

APPENDIXES

Appendix 1.1.1a-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of main road side segment 1 (km 0-5) in Kuala Gasib Village, Koto Gasib Sub-district, Siak District.

No	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Planchonia valida*	Putat	77.21	60.00	90.63	227.83	0.039	0.081
2	*Psychotria sp.*	-	18.82	20.00	6.25	45.07	0.075	0.158
3	*Syzygium* sp.1	Jambu-jambu	3.98	20.00	3.13	27.10	0.047	0.099
			100	**100**	**100**	**300**	**0.161**	**0.338**

Appendix 1.1.1a-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of main road side segment 1 (km 0-5) in Kuala Gasib Village, Koto Gasib Sub-district, Siak District.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Glochidion rubrum*	Pasir-pasir	44.6	60.0	63.4	168.0	0.126	0.161
2	*Planchonia valida*	Putat	45.8	24.0	28.4	98.3	0.155	0.200
3	*Alstonia spatulata*	Pule	6.1	4.0	6.0	16.1	0.073	0.094
4	*Vitex pinnata*	Leban	2.9	4.0	1.1	8.0	0.021	0.028
5	*Melastoma malabathricum*	Sendudu	0.3	4.0	0.5	4.9	0.012	0.016
6	*Archidendron jiringa*	Jering	0.2	4.0	0.5	4.7	0.012	0.016
			100	**100**	**100**	**300**	**0.400**	**0.514**

Appendix 1.1.1b-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of main road side segment 1 (km 0-5) in Kuala Gasib Village, Koto Gasib Sub-district, Siak District.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Claoxylon longifolium*	-	11.11	11.73	11.11	33.95	0.107	0.084
2	*Syzygium incarnatum*	Jambu-jambu	7.41	11.00	7.41	25.82	0.107	0.084
3	*Artocarpus integer*	Cempedak	3.70	17.80	3.70	25.20	0.037	0.029
4	*Syzygium occlusum*	Jambu kapas	7.41	10.10	7.41	24.92	0.107	0.084

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
5	*Mesua ferruginea*	-	7.41	6.88	7.41	21.70	0.080	0.062
6	*Vatica pauciflora*	-	7.41	6.78	7.41	21.60	0.095	0.074
7	*Glochidion rubrum*	Pasir-pasir	7.41	3.80	7.41	18.61	0.080	0.062
8	*Syzygium* sp.3	Jambu-jambu	7.41	2.65	7.41	17.46	0.061	0.048
9	*Artocarpus rigidus*	Trempinis	3.70	6.93	3.70	14.34	0.061	0.048
10	*Syzygium cymosum*	Jambu-jambu	3.70	6.71	3.70	14.12	0.095	0.074
11	*Diospyros maingayi*	Kayu arang	3.70	6.03	3.70	13.44	0.061	0.048
12	*Tarenna fragrans*	-	3.70	1.55	3.70	8.96	0.037	0.029
13	*Alseodaphne ceratoxylon*	-	3.70	1.32	3.70	8.73	0.037	0.029
14	*Syzygium* sp.2	Jambu-jambu	3.70	1.32	3.70	8.73	0.037	0.029
15	*Syzygium* sp.6	Jambu-jambu	3.70	1.32	3.70	8.73	0.037	0.029
16	*Calophyllum pulcherrimum*	Bintangur	3.70	1.11	3.70	8.52	0.037	0.029
17	*Mussaendopsis beccariana*	-	3.70	1.11	3.70	8.52	0.037	0.029
18	*Syzygium* sp.4	Jambu-jambu	3.70	0.92	3.70	8.33	0.037	0.029
19	*Syzygium* sp.5	Jambu-jambu	3.70	0.92	3.70	8.33	0.037	0.029
			100	**100**	**100**	**300**	**1.190**	**0.930**

Appendix 1.1.1b-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of main road side segment 1 (km 0-5) in Kuala Gasib Village, Koto Gasib Sub-district, Siak District.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Glochidion rubrum*	Pasir-pasir	23.0	33.3	34.2	90.5	0.159	0.167
2	*Elaeocarpus petiolatus*	Tenggek burung	21.3	13.3	21.1	55.7	0.142	0.149
3	*Syzygium occlusum*	Jambu-jambu	22.5	6.7	13.2	42.3	0.116	0.121
4	*Syzygium incarnatum*	Jambu-jambu	11.6	13.3	7.9	32.8	0.087	0.091
5	*Maranthes corymbosa*	-	7.9	6.7	7.9	22.5	0.087	0.091
6	*Syzygium cymosum*	Jambu-jambu	6.3	6.7	7.9	20.8	0.087	0.091
7	*Claoxylon longifolium*	-	3.2	6.7	2.6	12.5	0.042	0.044
8	*Symplocos lucida*	-	3.2	6.7	2.6	12.5	0.042	0.044
9	*Nephelium maingayi*	Rambutan hutan	1.0	6.7	2.6	10.3	0.042	0.044

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
			100	**100**	**100**	**300**	**0.804**	**0.842**

Appendix 1.1.2a-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of main road side segment 2 (km 6-10) in Pinang Sebatang Village, Tualang Timur Sub-district, Siak Distrcit.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Elaeis guineensis*	Sawit	49.46	16.00	17.65	83.10	0.133	0.133
2	*Acacia mangium*	Akasia	12.14	28.00	26.47	66.61	0.153	0.153
3	*Cocos nucifera*	Kelapa	20.14	16.00	11.76	47.90	0.109	0.109
4	*Hevea brasiliensis*	Rambung/karet	8.03	12.00	17.65	37.68	0.133	0.133
5	*Archidendron jiringa*	Jering	2.78	8.00	11.76	22.54	0.109	0.109
6	*Artocarpus heterophyllus*	Nangka	2.38	4.00	2.94	9.32	0.045	0.045
7	*Nephelium lappaceum*	Rambutan	2.14	4.00	2.94	9.08	0.045	0.045
8	*Areca catechu*	Pinang	1.48	4.00	2.94	8.42	0.045	0.045
9	*Macaranga gigantea*	Merkubung	0.80	4.00	2.94	7.74	0.045	0.045
10	*Artocarpus elasticus*	Terap	0.66	4.00	2.94	7.60	0.045	0.045
			100	**100**	**100**	**300**	**0.863**	**0.863**

Appendix 1.1.2a-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of main road side segment 2 (km 6-10) in Pinang Sebatang Village, Tualang Timur Sub-district, Siak Distrcit.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Hevea brasiliensis*	Rambung	39.4	14.6	28.1	82.2	0.155	0.111
2	*Melicope lunu-akenda*	Tenggek burung	14.6	17.1	24.6	56.2	0.150	0.107
3	*Vitex pinnata*	Laban	7.5	9.8	5.8	23.0	0.072	0.051
4	*Acacia mangium*	Akasia	7.4	8.5	6.3	22.2	0.075	0.054
5	*Ixonanthes petiolaris*	-	5.1	3.7	4.5	13.2	0.060	0.043
6	*Melastoma malabathricum*	Sendudu	2.3	6.1	4.0	12.4	0.056	0.040
7	*Mallotus paniculatus*	Anggrung	2.5	6.1	3.1	11.8	0.047	0.034

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
8	*Alstonia angustiloba*	Kulit pipit	2.1	4.9	4.5	11.4	0.060	0.043
9	*Macaranga javanica*	Mahang	1.4	4.9	2.7	8.9	0.042	0.030
10	*Artocarpus elasticus*	Terap	4.6	1.2	2.2	8.0	0.037	0.026
11	*Archidendron jiringa*	Jering	2.5	2.4	2.2	7.2	0.037	0.026
12	*Nephelium lappaceum*	Rambutan	2.0	2.4	2.2	6.7	0.037	0.026
13	*Guioa diplopetala*	-	1.1	2.4	1.8	5.3	0.031	0.022
14	*Eurya acuminata*	Meniran	2.3	1.2	1.3	4.9	0.025	0.018
15	*Endospermum diadenum*	Mangkok-mangkok	0.9	2.4	0.9	4.3	0.018	0.013
16	Macaranga gigantea	Mahang	1.3	1.2	0.4	3.0	0.010	0.008
17	*Ficus grossularioides*	Luwingan	0.3	1.2	1.3	2.9	0.025	0.018
18	*Garcinia parvifolia*	Asam kandis	0.5	1.2	0.9	2.6	0.018	0.013
19	*Artocarpus integer*	Cempedak	0.7	1.2	0.4	2.3	0.010	0.008
20	*Mangifera* sp.	Mangga	0.4	1.2	0.4	2.1	0.010	0.008
21	*Commersonia bartramia*	-	0.2	1.2	0.4	1.9	0.010	0.008
22	*Lepionurus sylvestris*	-	0.2	1.2	0.4	1.9	0.010	0.008
23	*Syzygium* sp.6	Samak	0.2	1.2	0.4	1.9	0.010	0.008
24	*Porterandia anisophylla*	-	0.1	1.2	0.4	1.8	0.010	0.008
25	*Rhodamnia cinerea*	-	0.1	1.2	0.4	1.8	0.010	0.008
			100	**100**	**100**	**300**	**1.030**	**0.737**

Appendix 1.1.2b-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of main road side segment 2 (km 6-10) in Pinang Sebatang Village, Tualang Timur Sub-district, Siak Distrcit.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Hevea brasiliensis*	Rambung/karet	45.18	35.56	60.63	141.36	0.132	0.118
2	*Elaeis guineensis*	Sawit	27.40	8.89	7.09	43.38	0.081	0.073
3	*Artocarpus elasticus*	Terap	10.79	11.11	7.87	29.77	0.087	0.078
4	*Ixonanthes petiolaris*	Maligan	2.65	11.11	4.72	18.48	0.063	0.056
5	*Vitex pinnata*	Leban	2.53	6.67	6.30	15.49	0.076	0.068
6	*Alstonia angustiloba*	Kulit pipit	2.37	6.67	4.72	13.77	0.063	0.056

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
7	*Artocarpus heterophyllus*	Nangka	3.21	6.67	2.36	12.24	0.038	0.034
8	*Melicope lunu-akenda*	Tenggek burung	1.19	2.22	1.57	4.99	0.028	0.025
9	*Xylopia ferruginea*	-	1.95	2.22	0.79	4.95	0.017	0.015
10	*Diospyros fasciculosa*	-	0.50	2.22	1.57	4.29	0.028	0.025
11	*Archidendron jiringa*	Jering	0.80	2.22	0.79	3.81	0.017	0.015
12	*Rhodamnia cinerea*	Baja baja	0.80	2.22	0.79	3.81	0.017	0.015
13	*Guioa diplopetala*	-	0.64	2.22	0.79	3.64	0.017	0.015
			100	**100**	**100**	**300**	**0.662**	**0.595**

Appendix 1.1.2b-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of main road side segment 2 (km 6-10) in Pinang Sebatang Village, Tualang Timur Sub-district, Siak Distrcit.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Hevea brasiliensis*	Rambung/karet	49.1	24.0	45.8	118.9	0.155	0.116
2	*Vitex pinnata* Linn.	Leban	18.0	4.0	9.3	31.3	0.096	0.072
3	*Alstonia angustiloba*	Kulit pipit	7.1	12.0	11.9	31.0	0.110	0.082
4	*Acacia mangium*	Akasia	2.5	12.0	5.1	19.5	0.066	0.049
5	*Garcinia parvifolia*	Asam kandis	2.0	6.0	2.5	10.5	0.041	0.030
6	*Artocarpus heterophyllus*	Nangka	4.4	4.0	1.7	10.1	0.030	0.022
7	*Lepionurus sylvestris*	-	3.0	4.0	2.5	9.6	0.041	0.030
8	*Guioa diplopetala*	-	1.5	4.0	3.4	8.9	0.050	0.037
9	*Ixonanthes petiolaris*	-	1.0	4.0	3.4	8.4	0.050	0.037
10	*Litsea umbellata*	Medang	3.3	2.0	1.7	7.0	0.030	0.022
11	*Artocarpus elasticus*	Terap	1.1	2.0	3.4	6.5	0.050	0.037
12	*Mallotus paniculatus*	Anggrung	2.5	2.0	0.8	5.3	0.018	0.013
13	*Diospyros fasciculosa*	Kayu arang	1.9	2.0	0.8	4.8	0.018	0.013
14	*Archidendron jiringa*	Jering	0.6	2.0	0.8	3.5	0.018	0.013
15	*Nephelium cuspidatum*	Rambutan hutan	0.6	2.0	0.8	3.5	0.018	0.013
16	*Horsfieldia glabra*	-	0.4	2.0	0.8	3.2	0.018	0.013

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
17	*Actinodaphne hookeri*	-	0.2	2.0	0.8	3.0	0.018	0.013
18	*Artocarpus kemando*	Cempedak hutan	0.2	2.0	0.8	3.0	0.018	0.013
19	*Barringtonia macrostachya*	Putat	0.2	2.0	0.8	3.0	0.018	0.013
20	*Clerodendrum tomentosum*	-	0.2	2.0	0.8	3.0	0.018	0.013
21	*Eurya acuminata*	-	0.2	2.0	0.8	3.0	0.018	0.013
22	*Ficus grossularioides*	Luwingan	0.2	2.0	0.8	3.0	0.018	0.013
			100	**100**	**100**	**300**	**0.911**	**0.678**

Appendix 1.1.3-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of main road side segment 3 (km 11-15) in Pinang Sebatang Village, Tualang Timur Sub-district, Siak Distrcit.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Artocarpus elasticus*	Terap	27.3	21.7	32.6	81.6	0.159	0.117
2	*Hevea brasiliensis*	Rambung/karet	33.8	21.7	26.1	81.6	0.152	0.112
3	*Archidendron jiringa*	Jering	5.4	5.8	5.8	16.9	0.072	0.053
4	*Vitex pinnata*	Leban	4.6	5.8	5.1	15.4	0.066	0.048
5	*Endospermum diadenum*	Mangkok-mangkok	3.6	2.9	2.9	9.4	0.045	0.033
6	*Baccaurea* sp.	-	2.2	4.3	2.2	8.7	0.036	0.027
7	*Nephelium ramboutan-ake*	Rambutan hutan	1.3	4.3	2.9	8.6	0.045	0.033
8	*Artocarpus integer*	Cempedak	2.4	2.9	2.9	8.2	0.045	0.033
9	*Afzelia rhomboidea*	-	2.8	2.9	1.4	7.1	0.027	0.020
10	*Sloetia elongata*	-	2.0	2.9	2.2	7.0	0.036	0.027
11	*Ficus vasculosa*	Ara	3.4	1.4	2.2	7.0	0.036	0.027
12	*Guioa diplopetala*	-	1.9	2.9	2.2	7.0	0.036	0.027
13	*Ixonanthes petiolaris*	-	1.4	2.9	2.2	6.5	0.036	0.027
14	*Albizia splendens*	-	0.8	2.9	1.4	5.2	0.027	0.020
15	*Alstonia angustiloba*	Kulit pipit	0.5	2.9	1.4	4.8	0.027	0.020
16	*Polyscias diversifolia*	-	2.1	1.4	0.7	4.3	0.016	0.011
17	Macaranga gigantea	Merkubung	1.1	1.4	1.4	4.0	0.027	0.020

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
18	*Castanopsis costata*	Berangan	0.7	1.4	0.7	2.9	0.016	0.011
19	*Ficus sp.*	Ara	0.6	1.4	0.7	2.8	0.016	0.011
20	*Artocarpus rigidus*	Trempinis	0.6	1.4	0.7	2.7	0.016	0.011
21	*Syzygium gracilis*	Jambu-jambu	0.6	1.4	0.7	2.7	0.016	0.011
22	*Commersonia bartramia*	Empelu	0.5	1.4	0.7	2.7	0.016	0.011
23	*Rhodamnia cinerea*	Baja baja	0.5	1.4	0.7	2.7	0.016	0.011
			100	**100**	**100**	**300**	**0.978**	**0.718**

Appendix 1.1.3-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of main road side segment 3 (km 11-15) in Pinang Sebatang Village, Tualang Timur Sub-district, Siak Distrcit.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Alstonia angustiloba*	Kulit pipit	13.8	13.7	22.0	49.4	0.145	0.098
2	*Hevea brasiliensis*	Rambung/karet	17.0	16.4	15.9	49.3	0.127	0.086
3	*Nephelium ramboutan-ake*	Rambutan hutan	12.0	6.8	6.1	24.9	0.074	0.050
4	*Artocarpus elasticus*	Terap	9.2	5.5	4.5	19.2	0.061	0.041
5	*Vitex pinnata*	Leban	6.1	5.5	5.3	16.9	0.068	0.046
6	*Rhodamnia cinerea*	Baja baja	5.5	4.1	6.1	15.7	0.074	0.050
7	*Sloetia elongata*	-	4.2	4.1	3.8	12.1	0.054	0.036
8	*Artocarpus integer*	Cempedak	3.3	2.7	3.8	9.8	0.054	0.036
9	*Garcinia parvifolia*	Asam kandis	1.7	4.1	3.8	9.6	0.054	0.036
10	*Archidendron jiringa*	Jering	5.5	1.4	2.3	9.1	0.037	0.025
11	*Dillenia beccariana*	Simpur	2.4	1.4	4.5	8.3	0.061	0.041
12	*Dillenia eximia*	Simpur	3.7	2.7	1.5	7.9	0.028	0.019
13	*Adinandra sarosanthera*	-	2.7	2.7	2.3	7.7	0.037	0.025
14	*Pellacalyx lobbii*	-	2.7	2.7	2.3	7.7	0.037	0.025
15	*Afzelia rhomboidea*	-	1.5	2.7	2.3	6.5	0.037	0.025
16	*Santiria rubiginosa*	-	1.9	2.7	1.5	6.1	0.028	0.019
17	*Diospyros fasciculosa*	Kayu arang	0.7	2.7	1.5	5.0	0.028	0.019
18	*Trigoniastrum hypoleucum*	-	1.4	1.4	1.5	4.3	0.028	0.019

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
19	*Homalanthus populneus*	Kareumbi	1.0	1.4	0.8	3.2	0.016	0.011
20	*Eurya acuminata*	Meniran	0.7	1.4	0.8	2.8	0.016	0.011
21	*Macaranga triloba*	Mahang	0.7	1.4	0.8	2.8	0.016	0.011
22	*Cratoxylum cochinchinensis*	-	0.4	1.4	0.8	2.5	0.016	0.011
23	*Erycibe* sp.	-	0.4	1.4	0.8	2.5	0.016	0.011
24	*Ixonanthes icosandra*	-	0.4	1.4	0.8	2.5	0.016	0.011
25	*Syzygium* sp.	Samak	0.4	1.4	0.8	2.5	0.016	0.011
26	*Actinodaphne hookeri*	-	0.2	1.4	0.8	2.3	0.016	0.011
27	*Canarium denticulatum*	-	0.2	1.4	0.8	2.3	0.016	0.011
28	*Lepionurus sylvestris*	-	0.2	1.4	0.8	2.3	0.016	0.011
29	*Melicope lunu-akenda*	Tenggek burung	0.2	1.4	0.8	2.3	0.016	0.011
30	*Ptychopyxis bacciformis*	-	0.2	1.4	0.8	2.3	0.016	0.011
			100	**100**	**100**	**300**	**1.223**	**0.828**

Appendix 1.1.4-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of main road side segment 4 (km 16-20) in Bakal Village, Tualang Timur Sub-district, Siak District.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Hevea brasiliensis*	Rambung/karet	65.4	40.8	75.8	182.1	0.091	0.068
2	*Ixonanthes petiolaris*	Maligan	4.9	6.1	2.7	13.8	0.043	0.032
3	*Nephelium cuspidatum*	Rambutan hutan	4.9	4.1	1.6	10.6	0.029	0.022
4	*Artocarpus elasticus*	Terap	3.8	4.1	2.2	10.1	0.036	0.027
5	*Archidendron borneense*	Jering	3.4	2.0	2.7	8.2	0.043	0.032
6	*Dracaena fragrans*	Hanjuang	2.4	4.1	1.6	8.2	0.029	0.022
7	*Syzygium cymosum*	Kelat	4.5	2.0	1.1	7.6	0.022	0.016
8	*Macaranga javanica*	Mahang	0.8	4.1	1.1	6.0	0.022	0.016
9	*Garcinia parvifolia*	Asam kandis	0.7	4.1	1.1	5.8	0.022	0.016
10	*Vitex pinnata*	Leban	0.4	4.1	1.1	5.6	0.022	0.016
11	*Alstonia angustiloba*	Kulit pipit	1.7	2.0	1.1	4.8	0.022	0.016
12	*Nephelium lappaceum*	Rambutan	1.6	2.0	1.1	4.7	0.022	0.016

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
13	*Xylopia ferruginea*	-	0.6	2.0	1.1	3.8	0.022	0.016
14	*Pellacalyx lobbii*	-	1.0	2.0	0.5	3.6	0.012	0.009
15	*Artocarpus integer*	Cempedak	0.4	2.0	1.1	3.5	0.022	0.016
16	*Artocarpus heterophyllus*	Nangka	0.7	2.0	0.5	3.3	0.012	0.009
17	*Artocarpus nitidus*	Cempedak hutan	0.7	2.0	0.5	3.3	0.012	0.009
18	*Porterandia anisophylla*	-	0.7	2.0	0.5	3.3	0.012	0.009
19	*Scorodocarpus borneensis*	Semine	0.6	2.0	0.5	3.2	0.012	0.009
20	*Archidendron jiringa*	Jering	0.3	2.0	0.5	2.9	0.012	0.009
21	*Ochanostachys amentacea*	-	0.3	2.0	0.5	2.9	0.012	0.009
22	*Dillenia eximia*	Simpur	0.2	2.0	0.5	2.8	0.012	0.009
			100	**100**	**100**	**300**	**0.544**	**0.405**

Appendix 1.1.4-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of main road side segment 4 (km 16-20) in Bakal Village, Tualang Timur Sub-district, Siak District.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Hevea brasiliensis*	Rambung	69.5	41.5	51.2	162.2	0.149	0.127
2	*Alstonia angustiloba*	Kulit pipit	5.3	14.6	15.1	35.0	0.124	0.105
3	*Garcinia parvifolia*	Asam kandis	9.5	4.9	11.6	26.0	0.109	0.092
4	*Lepionurus sylvestris*	-	1.3	9.8	4.7	15.8	0.062	0.053
5	*Porterandia anisophylla*	-	1.2	4.9	3.5	9.5	0.051	0.043
6	*Dialium indum*	Asam kranji	4.7	2.4	1.2	8.3	0.022	0.019
7	*Ixonanthes petiolaris*	Maligan	2.8	2.4	1.2	6.4	0.022	0.019
8	*Lansium parasiticum*	Duku	0.8	2.4	2.3	5.5	0.038	0.032
9	*Artocarpus elasticus*	Terap	1.4	2.4	1.2	5.0	0.022	0.019
10	*Archidendron jiringa*	Jering	0.5	2.4	1.2	4.1	0.022	0.019
11	*Macaranga javanica*	Mahang	0.5	2.4	1.2	4.1	0.022	0.019
12	*Parkia timoriana*	-	0.5	2.4	1.2	4.1	0.022	0.019
13	*Afzelia rhomboidea*	-	0.2	2.4	1.2	3.8	0.022	0.019
14	*Endospermum diadenum*	Mangkok-mangkok	0.2	2.4	1.2	3.8	0.022	0.019

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
15	gendub	-	1.4	2.4	2.3	6.2	0.038	0.032
			100	**100**	**100**	**300**	**0.750**	**0.638**

Appendix 1.1.5-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of main road side segment 5 (km 20-25) in Bakal Village, Tualang Timur Sub-district, Siak District.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Elaeis guineensis*	Sawit	41.898	16.364	21.348	79.609	0.143	0.112
2	*Ixonanthes petiolaris*	Maligan	13.374	16.364	15.730	45.468	0.126	0.099
3	*Artocarpus elasticus*	Terap	15.089	9.091	7.865	32.045	0.087	0.068
4	*Endospermum diadenum*	Mangkok-mangkok	4.934	7.273	8.989	21.195	0.094	0.074
5	*Rhodamnia cinerea*	Baja baja	3.565	9.091	7.865	20.521	0.087	0.068
6	*Alstonia angustiloba*	Kulit pipit	3.753	7.273	7.865	18.891	0.087	0.068
7	*Garcinia parvifolia*	Asam kandis	3.302	5.455	4.494	13.251	0.061	0.047
8	*Glochidion rubrum*	Pasir-pasir	2.208	3.636	5.618	11.462	0.070	0.055
9	*Dillenia eximia*	Simpur	1.693	3.636	4.494	9.823	0.061	0.047
10	*Artocarpus rigidus*	Tempinis	1.332	3.636	2.247	7.216	0.037	0.029
11	*Vitex pinnata*	Leban	0.986	3.636	2.247	6.870	0.037	0.029
12	*Ficus glandulifera*	Ara	3.393	1.818	1.124	6.335	0.022	0.017
13	*Litsea grandis*	-	1.011	1.818	3.371	6.200	0.050	0.039
14	*Syzygium lineatum*	Jambu-jambu	1.108	1.818	1.124	4.050	0.022	0.017
15	*Macaranga pruinosa*	Mahang	0.801	1.818	1.124	3.742	0.022	0.017
16	*Syzygium* sp.5	Jambu-jambu	0.543	1.818	1.124	3.485	0.022	0.017
17	*Fordia splendidissima*	-	0.399	1.818	1.124	3.341	0.022	0.017
18	gendub	-	0.335	1.818	1.124	3.277	0.022	0.017
19	*Anisoptera marginata*	-	0.277	1.818	1.124	3.219	0.022	0.017
			100	**100**	**100**	**300**	**1.093**	**0.854**

Appendix 1.1.5-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of main road side segment 5 (km 20-25) in Bakal Village, Tualang Timur Sub-district, Siak District.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Ixonanthes petiolaris*	Maligan	24.5	8.9	13.7	47.1	0.118	0.080
2	*Alstonia angustiloba*	Kulit pipit	26.5	6.7	12.3	45.4	0.112	0.076
3	*Endospermum diadenum*	Mangkok-mangkok	15.1	6.7	15.1	36.8	0.124	0.084
4	*Acacia mangium*	Akasia	2.1	6.7	5.5	14.3	0.069	0.047
5	*Dillenia eximia*	Simpur	2.1	4.4	6.8	13.4	0.080	0.054
6	*Rhodamnia cinerea*	Baja baja	2.0	6.7	4.1	12.8	0.057	0.039
7	*Fordia splendidissima*	-	5.9	2.2	2.7	10.8	0.043	0.029
8	*Actinodaphne hookeri*	-	0.9	4.4	2.7	8.1	0.043	0.029
9	*Guioa diplopetala*	-	0.9	4.4	2.7	8.1	0.043	0.029
10	*Macaranga javanica*	Mahang	0.9	4.4	2.7	8.1	0.043	0.029
11	*Gynotroches axillaris*	-	3.1	2.2	2.7	8.1	0.043	0.029
12	*Adinandra sarosanthera*	-	2.5	2.2	1.4	6.1	0.026	0.017
13	*Ficus glandulifera*	Ara	2.5	2.2	1.4	6.1	0.026	0.017
14	*Ardisia teysmaniana*	-	0.6	2.2	2.7	5.5	0.043	0.029
15	*Horsfieldia polyspherula*	-	1.7	2.2	1.4	5.3	0.026	0.017
16	*Macaranga pruinosa*	Mahang	0.3	2.2	2.7	5.2	0.043	0.029
17	*Ficus grossularioides*	Luwingan	1.1	2.2	1.4	4.7	0.026	0.017
18	*Gonocaryum calleryanum*	-	1.1	2.2	1.4	4.7	0.026	0.017
19	*Homalanthus populneus*	Kareumbi	1.1	2.2	1.4	4.7	0.026	0.017
20	*Garcinia parvifolia*	Asam kandis	0.6	2.2	1.4	4.2	0.026	0.017
21	*Gironniera subaequalis*	-	0.6	2.2	1.4	4.2	0.026	0.017
22	*Macaranga trichocarpa*	Mahang	0.6	2.2	1.4	4.2	0.026	0.017
23	*Mallotus paniculatus*	Anggrung	0.6	2.2	1.4	4.2	0.026	0.017
24	*Mussaendopsis beccariana*	-	0.6	2.2	1.4	4.2	0.026	0.017
25	*Syzygium gracilis*	Jambu-jambu	0.6	2.2	1.4	4.2	0.026	0.017
26	*Anisophyllea disticha*	-	0.3	2.2	1.4	3.9	0.026	0.017
27	*Clidemia hirta*	Senggani	0.3	2.2	1.4	3.9	0.026	0.017

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
28	*Elaeocarpus polystachyus*	-	0.3	2.2	1.4	3.9	0.026	0.017
29	*Vitex pinnata*	Leban	0.3	2.2	1.4	3.9	0.026	0.017
30	*Xylopia ferruginea*	-	0.3	2.2	1.4	3.9	0.026	0.017
			100	**100**	**100**	**300**	**1.294**	**0.876**

Appendix 1.2.1a-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of plantation road side segment 1 (km 1-5) in Melebung Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Hevea brasiliensis*	Rambung	100	100	100	300	-	-
			100	**100**	**100**	**300**	-	-

Appendix 1.2.1a-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of plantation road side segment 1 (km 1-5) in Melebung Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Hevea brasiliensis*	Rambung	90.1	85.7	80.0	255.8	0.078	0.241
2	*Artocarpus rigidus*	Tempinis	9.9	14.3	20.0	44.2	0.140	0.434
			100	**100**	**100**	**300**	**0.217**	**0.674**

Appendix 1.2.1b-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of plantation road side segment 1 (km 1-5) in Melebung Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Neonauclea purpurea*	Jabon	95.5	85.0	95.3	275.8	0.020	0.066
2	*Acacia mangium*	Akasia	4.5	15.0	4.7	24.2	0.062	0.207
			100	**100**	**100**	**300**	**0.082**	**0.273**

Appendix 1.2.1b-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of plantation road side segment 1 (km 1-5) in Melebung Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Neonauclea purpurea*	Jabon	71.4	66.7	74.3	212.3	0.096	0.201
2	*Acacia mangium*	Akasia	10.8	22.2	11.4	44.4	0.108	0.226
3	*Mallotus paniculatus*	Anggrung	17.8	11.1	14.3	43.2	0.121	0.253
			100	**100**	**100**	**300**	**0.324**	**0.680**

Appendix 1.2.2a-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of plantation road side segment 2 (km 6-10) in Melebung Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Elaeis guineensis*	Sawit	100	100	100	300	-	-
			100	**100**	**100**	**300**	-	-

Appendix 1.2.2b-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of plantation road side segment 2 (km 6-10) in Melebung Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Elaeis guineensis*	Sawit	100	100	100	300	-	-
			100	**100**	**100**	**300**	-	-

Appendix 1.2.3a-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of plantation road side segment 3 (km 11-15) in Melebung Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Elaeis guineensis*	Sawit	79.9	42.1	57.1	179.2	0.139	0.461

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
2	*Neonauclea purpurea*	Jabon	20.1	57.9	42.9	120.8	0.158	0.524
			100	**100**	**100**	**300**	**0.297**	**0.985**

Appendix 1.2.3a-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of gas pipeline construction plan of plantation road side segment 3 (km 11-15) in Melebung Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Neonauclea purpurea*	Jabon	100	100	100	300	-	-
			100	**100**	**100**	**300**	**-**	**-**

Appendix 1.2.3b-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of gas pipeline construction plan of plantation road side segment 3 (km 11-15) in Melebung Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Elaeis guineensis*	Sawit	100	100	100	300	-	-
			100	**100**	**100**	**300**	**-**	**-**

Appendix 2.1a-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of SGPP construction plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Elaeis guineensis*	Sawit	100	100	100	300	-	-
			100	**100**	**100**	**300**	**-**	**-**

Appendix 2.1b-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of SGPP construction plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Elaeis guineensis*	Sawit	91.9	86.4	91.4	269.7	0.036	0.059
2	*Archidendron jiringa*	Jering	3.2	4.5	2.9	10.6	0.044	0.073
3	*Arenga pinnata*	Enau	2.7	4.5	2.9	10.1	0.044	0.073
4	*Mangifera* sp.2	Mangga	2.2	4.5	2.9	9.6	0.044	0.073
			100	**100**	**100**	**300**	**0.168**	**0.279**

Appendix 2.1c-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of SGPP construction plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Elaeis guineensis*	Sawit	100	100	100	300	-	-
			100	**100**	**100**	**300**	**-**	**-**

Appendix 2.2-Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of SGPP transmission line construction plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Acacia mangium*	Akasia	69.7	50.0	69.0	188.8	0.111	0.116
2	*Artocarpus elasticus*	Terap	8.8	15.0	9.5	33.3	0.097	0.102
3	*Artocarpus integer*	Cempedak	6.0	5.0	2.4	13.4	0.039	0.041
4	*Endospermum diadenum*	Mangkok-mangkok	3.3	5.0	4.8	13.1	0.063	0.066
5	*Afzelia rhomboidea*	-	3.0	5.0	4.8	12.8	0.063	0.066
6	*Macaranga gigantea*	Merkubung	3.1	5.0	2.4	10.4	0.039	0.041
7	*Syzygium palembanicum*	Jambu-jambu	3.1	5.0	2.4	10.4	0.039	0.041
8	*Archidendron jiringa*	Jering	1.7	5.0	2.4	9.0	0.039	0.041
9	*Glochidion superbum*	-	1.4	5.0	2.4	8.7	0.039	0.041
			100	**100**	**100**	**300**	**0.527**	**0.553**

Appendix 2.2-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of SGPP transmission line construction plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Acacia mangium*	Akasia	45.1	26.2	37.1	108.4	0.160	0.130
2	*Bambusa vulgaris*	Bambu kuning	31.4	3.1	31.6	66.0	0.158	0.128
3	*Melicope lunu-akenda*	Tenggek burung	3.7	15.4	6.8	25.9	0.080	0.065
4	*Artocarpus elasticus*	Terap	5.9	9.2	4.6	19.7	0.061	0.050
5	*Commersonia bartramia*	Empelu	2.9	7.7	2.9	13.5	0.045	0.037
6	*Artocarpus rigidus*	Tempinis	4.2	3.1	3.6	10.8	0.052	0.042
7	*Macaranga trichocarpa*	Mahang	0.8	7.7	2.3	10.7	0.037	0.030
8	*Macaranga javanica*	Mahang	0.6	6.2	1.6	8.4	0.029	0.024
9	*Ficus grossularioides*	Luwingan	0.5	4.6	1.3	6.5	0.025	0.020
10	*Sarcotheca macrophylla*	-	0.1	1.5	4.2	5.8	0.058	0.047
11	*Hevea brasiliensis*	Rambung	1.4	3.1	1.0	5.5	0.020	0.016
12	*Endospermum diadenum*	Mangkok-mangkok	0.8	3.1	0.7	4.5	0.014	0.012
13	*Melastoma malabathricum*	Sendudu	0.2	3.1	0.7	3.9	0.014	0.012
14	*Afzelia rhomboidea*	-	0.9	1.5	0.3	2.7	0.008	0.007
15	*Artocarpus integer*	Cempedak	0.8	1.5	0.3	2.6	0.008	0.007
16	*Glochidion superbum*	-	0.6	1.5	0.3	2.5	0.008	0.007
17	*Artocarpus nitidus*	Cempedak hutan	0.2	1.5	0.7	2.4	0.014	0.012
			100	**100**	**100**	**300**	**0.791**	**0.643**

Appendix 3.1-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of water supply channel plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Hevea brasiliensis*	Rambung	51.292	28.947	44.068	124.3	0.157	0.141
2	*Macaranga pruinosa*	Mahang	15.822	15.789	13.559	45.2	0.118	0.106
3	*Glochidion rubrum*	Pasir-pasir	12.878	15.789	13.559	42.2	0.118	0.106
4	*Artocarpus rigidus*	Tempinis	4.663	7.895	6.780	19.3	0.079	0.071

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
5	*Melicope lunu-akenda*	Tenggek burung	2.845	5.263	3.390	11.5	0.050	0.045
6	*Vitex pinnata*	Leban	2.607	5.263	3.390	11.3	0.050	0.045
7	*Ficus variegata*	Gondang/Gedobuk	1.645	5.263	3.390	10.3	0.050	0.045
8	*Elaeocarpus palembanicus*	-	2.385	2.632	3.390	8.4	0.050	0.045
9	*Archidendron clypearia*	-	1.612	2.632	1.695	5.9	0.030	0.027
10	*Glochidion zeylanicum*	Paisr-pasir	1.612	2.632	1.695	5.9	0.030	0.027
11	*Syzygium cymosum*	Kelat	0.995	2.632	1.695	5.3	0.030	0.027
12	*Aporosa arborea*	-	0.822	2.632	1.695	5.1	0.030	0.027
13	*Ficus padana*	Bulu-bulu	0.822	2.632	1.695	5.1	0.030	0.027
			100	**100**	**100**	**300**	**0.821**	**0.737**

Appendix 3.1-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of water supply channel plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Gigantochloa apus*	Bambu	23.9	4.2	51.8	80.0	0.148	0.101
2	*Macaranga pruinosa*	Mahang	16.1	11.3	9.4	36.8	0.096	0.066
3	*Ficus variegata*	Gondang/Gedobuk	12.4	8.5	8.3	29.1	0.090	0.061
4	*Artocarpus rigidus*	Tempinis	7.5	8.5	4.7	20.6	0.062	0.043
5	*Ficus padana*	Bulu-bulu	7.5	8.5	2.5	18.4	0.040	0.028
6	*Hevea brasiliensis*	Rambung	6.1	7.0	2.9	16.1	0.044	0.030
7	*Melicope lunu-akenda*	Tenggek burung	1.6	8.5	2.9	12.9	0.044	0.030
8	*Commersonia bartramia*	Empelu	4.2	5.6	1.4	11.2	0.027	0.018
9	*Mallotus paniculatus*	Anggrung	4.9	2.8	2.2	9.9	0.036	0.025
10	*Dillenia excelsa*	Simpur	2.5	4.2	2.5	9.3	0.040	0.028
11	*Vitex pinnata*	Leban	3.3	2.8	2.9	9.0	0.044	0.030
12	*Nephelium lappaceum*	Rambutan	1.3	2.8	0.7	4.8	0.015	0.011
13	*Leea indica*	Girang	0.5	2.8	1.1	4.4	0.021	0.015
14	*Cyathea* sp.	-	1.7	1.4	0.7	3.8	0.015	0.011
15	*Glochidion rubrum*	Pasir-pasir	1.5	1.4	0.4	3.3	0.009	0.006

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
16	*Caryota mitis*	Palem sarai	1.3	1.4	0.4	3.1	0.009	0.006
17	*Ilex cymosa*	Kelat putih	0.6	1.4	0.7	2.7	0.015	0.011
18	*Bellucia pentamera*	-	0.8	1.4	0.4	2.5	0.009	0.006
19	*Santiria apiculata*	-	0.3	1.4	0.7	2.4	0.015	0.011
20	*Macaranga javanica*	Mahang	0.4	1.4	0.4	2.2	0.009	0.006
21	*Glochidion zeylanicum*	-	0.3	1.4	0.4	2.0	0.009	0.006
22	*Phoebe laevis*	-	0.3	1.4	0.4	2.0	0.009	0.006
23	*Ficus fistulosa*	Ara	0.2	1.4	0.4	2.0	0.009	0.006
24	*Garcinia parvifolia*	Asam kandis	0.2	1.4	0.4	2.0	0.009	0.006
25	*Macaranga triloba*	Mahang damar	0.2	1.4	0.4	2.0	0.009	0.006
26	*Aporosa arborea*	-	0.1	1.4	0.4	1.9	0.009	0.006
27	*Canarium caudatum*	-	0.1	1.4	0.4	1.9	0.009	0.006
28	*Trema tomentosa*	-	0.1	1.4	0.4	1.9	0.009	0.006
29	*Syzygium cymosum*	Kelat	0.1	1.4	0.4	1.9	0.009	0.006
			100	**100**	**100**	**300**	**0.869**	**0.594**

Appendix 3.2-p Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of tree were identified on the site of water supply channel plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Acacia mangium*	Akasia	100	100	100	300	-	-
			100	**100**	**100**	**300**	**-**	**-**

Appendix 3.2-ap Name of species, family, region name, relative dominance, relative frequency, relative density, importance value index, species diversity index, and species evenness index of sapling were identified on the site of water supply channel plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
1	*Acacia mangium*	Akasia	63.9	24.3	35.3	123.5	0.080	0.068
2	*Macaranga javanica*	Mahang	6.9	17.1	17.3	41.3	0.066	0.056
3	*Melicope lunu-akenda*	Tenggek burung	10.4	10.0	15.3	35.6	0.062	0.053

No.	Species Name	Region Name	DN	FN	KN	INP	H'	E
			(%)	(%)	(%)	(%)	(-pilogpi)	H'/logS
4	*Melastoma malabathricum*	Sendudu	1.8	14.3	6.4	22.5	0.038	0.033
5	*Alstonia angustiloba*	Kulit pipit	5.5	5.7	8.0	19.2	0.044	0.037
6	*Vitex pinnata*	Leban	3.3	7.1	5.2	15.7	0.033	0.028
7	*Aporosa arborea*	-	2.2	4.3	4.4	10.9	0.030	0.025
8	*Ficus grossularioides*	Luwingan	0.7	4.3	2.0	7.0	0.017	0.014
9	*Commersonia bartramia*	-	0.5	4.3	1.6	6.4	0.014	0.012
10	*Artocarpus elasticus*	Terap	2.2	1.4	2.0	5.7	0.017	0.014
11	*Barringtonia lanceolata*	-	1.6	1.4	0.4	3.4	0.005	0.004
12	*Archidendron jiringa*	Jering	0.4	1.4	0.8	2.6	0.008	0.007
13	*Afzelia rhomboidea*	-	0.4	1.4	0.4	2.3	0.005	0.004
14	*Cratoxylum cochinchinensis*	-	0.1	1.4	0.4	2.0	0.005	0.004
15	*Timonius sericeus*	-	0.1	1.4	0.4	1.9	0.005	0.004
			100	**100**	**100**	**300**	**0.430**	**0.365**

Appendix 4.1 Family, genus, and species wealth was identified for every plot in the site of gas pipeline construction plan in Siak and Pekanbaru

No.	Species Name	Region Name	TREE													SAPLING												
			1.1 Main Road Side Segment							1.2 Plantation Road Side Segment						1.1 Main Road Side Segment							1.2 Ruas Sisi Jalan Kebun					
			1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b	1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b
	Anacardiaceae																											
1	*Mangifera* sp.	Mangga	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
	Anisophlleaceae																											
2	*Anisophyllea disticha* (Jack) Baill.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
	Annonaceae																											
3	*Xylopia ferruginea* (Hook.f. & Thomson) Baill.	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
	Apocynaceae																											
4	*Alstonia angustiloba* Miq.	Kulit pipit	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	+	+	+	+	+	-	-	-	-	-	-
5	*Alstonia spatulata* Blume	Pule	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	Aquifoliaceae																											
6	*Ilex cymosa* Blume	Kelat putih	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Araliaceae																											
7	*Polyscias diversifolia* (Blume) Lowry & G.M. Plunkett	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arecaceae																											
8	*Areca catechu* L.	Pinang	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	*Caryota mitis* Lour.	Palem sarai	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	*Cocos nucifera* Linn.	Kelapa	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	*Elaeis guineensis* Jack.	Sawit	-	-	+	+	-	-	+	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
	Asparagaceae																											
12	*Dracaena fragrans* (L.) Ker. Gawl.	Hanjuang	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Burseraceae																											
13	*Canarium caudatum* King	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	*Canarium denticulatum* Blume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
15	*Santiria apiculata* A.W. Benn.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	*Santiria rubiginosa* Blume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
	Cannabaceae																											
17	*Gironniera subaequalis* Planch.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
18	*Trema tomentosa* (Roxb.) H. Hara	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

No.	Species Name	Region Name	TREE													SAPLING												
			1.1 Main Road Side Segment							1.2 Plantation Road Side Segment						1.1 Main Road Side Segment							1.2 Ruas Sisi Jalan Kebun					
			1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b	1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b
	Cardiopteridaceae																											
19	*Gonocaryum calleryanum* (Baill.) Bacc.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
	Chrysobalanaceae																											
20	*Maranthes corymbosa* Blume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
	Clusiaceae																											
21	*Calophyllum pulcherrimum* Wall.ex Choisy	Bintangur	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	*Garcinia parvifolia* (Miq.) Miq.	Asam kandis	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	+	+	+	+	+	-	-	-	-	-	-
23	*Mesua ferruginea* (Pierre) Kosterm.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Convolvulaceae																											
24	*Erycibe* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
	Cyatheaceae																											
25	*Cyathea* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dilleniaceae																											
26	*Dillenia beccariana* Martelli	Simpur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
27	*Dillenia excelsa* (Jack) Martelli ex Gilg.	Simpur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	*Dillenia eximia* Miq.	Simpur	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-
	Dipterocarpaceae																											
29	*Vatica pauciflora* Blume	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	*Anisoptera marginata* Korth.	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ebenaceae																											
31	*Diospyros fasciculosa* (F. Muell.) F. Muell.	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-
32	*Diospyros maingayi* Bakh.	Kayu arang	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Elaeocarpaceae																											
33	*Elaeocarpus petiolatus* (Jacq.) Wall.	Tenggek burung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
34	*Elaeocarpus polystachyus* Wall.ex Mull. Berol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
	Euphorbiaceae																											
35	*Claoxylon longifolium* (Blume) Hassk.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-

No.	Species Name	Region Name	TREE													SAPLING												
			1.1 Main Road Side Segment							1.2 Plantation Road Side Segment						1.1 Main Road Side Segment							1.2 Ruas Sisi Jalan Kebun					
			1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b	1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b
36	*Endospermum diadenum* (Miq.) Airy Shaw	Mangkok-mangkok	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	+	-	-	+	+	-	-	-	-	-	-
37	*Hevea brasiliensis* Muell.Ag.	Rambung	-	-	+	+	+	+	-	+	-	-	-	-	-	-	-	+	+	+	+	-	+	-	-	-	-	-
38	*Homalanthus populneus* (Geiseler) Pax	Kareumbi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-
39	*Macaranga gigantea* (Rcfb.f.&Zoll.) Muell. Arg.	Merkubung	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
40	*Macaranga javanica* (Blume) Muell. Arg	Mahang	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	+	+	-	-	-	-	-	-
41	*Macaranga pruinosa* (Miq.) Muell. Arg.	Mahang	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
42	*Macaranga trichocarpa* (Zoll.) Muell. Arg.	Mahang	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
43	*Macaranga triloba* Muell. Arg.	Mahang	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
44	*Mallotus paniculatus* (Lam.) Muell. Arg.	Anggrung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	+	-	-	-	-
45	*Ptychopyxis bacciformis* Croizat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
	Fagaceae																											
46	*Castanopsis costata* (Blume) A. DC.	Berangan	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hypericaceae																											
47	*Cratoxylum cochinchinensis* (Lour.) Blume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
48	*Cratoxylum cochinchinensis* (Lour.) Blume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ixonanthaceae																											
49	*Ixonanthes icosandra* Jack	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
50	*Ixonanthes petiolaris* Blume	Maligan	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	+	+	-	+	+	-	-	-	-	-	-
	Lamiaceae																											
51	*Clerodendrum tomentosum* (Vent.) R Br.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
52	*Vitex pinnata* Linn.	Laban	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
	Lauraceae																											
53	*Actinodaphne hookeri* Meisn.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	+	-	-	-	-	-	-
54	*Alseodaphne ceratoxylon* Kostrm.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	*Litsea grandis* (Nees) Hook.f.	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

No.	Species Name	Region Name	TREE													SAPLING												
			1.1 Main Road Side Segment							1.2 Plantation Road Side Segment						1.1 Main Road Side Segment							1.2 Ruas Sisi Jalan Kebun					
			1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b	1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b
56	*Litsea umbellata* (Lour.) Merr.	Medang	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
57	*Phoebe laevis* Kosterm.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lecythidaceae																											
58	*Barringtonia lanceolata* (Ridl.) Payens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	*Barringtonia macrostachya* (Jack) Kurz.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
60	*Planchonia valida* (Blume) Blume	Putat	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	Leguminosae																											
61	*Acacia mangium* Wild.	Akasia	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	+	+	-	-	+	-	+	-	-	-	-
62	*Afzelia rhomboidea* (Blanco) S. Vidal	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-
63	*Albizia splendens* Miq.	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64	*Archidendron borneense* (Benth) I.C. Nielsen	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	*Archidendron jiringa* (Jack) I. Nielsen	Jering	-	-	+	+	+	+	-	-	-	-	-	-	-	+	-	+	+	+	+	-	-	-	-	-	-	-
66	*Dialium indum* L.	Asam kranji	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
67	*Fordia splendidissima* (Miq.) Buijsen	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
68	*Parkia timoriana* (DC.) Merr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
	Malvaceae																											
69	*Commersonia bartramia* (L.) Merr.	Empelu	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
	Melastomataceae																											
70	*Clidemia hirta* (L.) D. Don.	Senggani	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
71	*Melastoma malabathricum* Jack.	Sendudu	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	Meliaceae																											
72	*Lansium parasiticum* (Osbeck) K.C. Sahni & Bennet	Duku	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
	Moraceae																											
73	*Artocarpus elasticus* Reinw. ex Blume	Terap	-	-	+	+	+	+	+	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-
74	*Artocarpus heterophyllus* Lmk.	Nangka	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
75	*Artocarpus integer* (Thunb.) Merr.	Cempedak	-	+	-	-	+	+	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-

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			1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b	1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b
76	*Artocarpus kemando* Miq.	Cempedak hutan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
77	*Artocarpus nitidus* Trecc.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	*Artocarpus rigidus* Blume	Tempinis	-	+	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
79	*Ficus glandulifera* (Miq.) Wall. ex King	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
80	*Ficus grossularioides* Burm.f.	Luwingan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	-	-	-	-	-
81	*Ficus sp.*	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82	*Ficus vasculosa* Wall. ex Miq	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	*Sloetia elongata* Koord.	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
	Myristicaceae																											
84	*Horsfieldia polyspherula* (Hook.f.ex King) J. Sinclair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
85	*Horsfieldia glabra* (Reinw.ex Blume) Warb.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
	Myrtaceae																											
86	*Rhodamnia cinerea* Jack	Baja baja	-	-	-	+	+	-	+	-	-	-	-	-	-	-	-	+	-	+	-	+	-	-	-	-	-	-
87	*Syzygium cymosum* (Lam.) DC.	Jambu-jambu	-	+	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
88	*Syzygium gracilis* (Korth.) Amsh.	Jambu-jambu	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
89	*Syzygium incarnatum* Merr. & L.M. Perry	Jambu-jambu	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
90	*Syzygium lineatum* (DC.) Merr. & L.M. Perry	Jambu-jambu	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91	*Syzygium occlusum* Miq. cf.	Jambu-jambu	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
92	*Syzygium* sp.	Samak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
93	*Syzygium* sp.1	Jambu-jambu	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	*Syzygium* sp.2	Jambu-jambu	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95	*Syzygium* sp.3	Jambu-jambu	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
96	*Syzygium* sp.4	Jambu-jambu	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97	*Syzygium* sp.5	Jambu-jambu	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
98	*Syzygium* sp.6	Samak	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
	Opiliaceae																											
99	*Lepionurus sylvestris* Blume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-
	Olacaceae																											

No.	Species Name	Region Name	TREE													SAPLING												
			1.1 Main Road Side Segment							1.2 Plantation Road Side Segment						1.1 Main Road Side Segment							1.2 Ruas Sisi Jalan Kebun					
			1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b	1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b
100	*Ochanostachys amentacea* Mast.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	*Scorodocarpus borneensis* (Baill.) Becc.	Semine	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oxalidaceae																												
102	*Sarcotheca macrophylla* Blume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phyllanthaceae																												
103	*Adinandra sarosanthera* Miq.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-
104	*Baccaurea* sp.	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	*Eurya acuminata* DC.	Meniran	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-
106	*Glochidion rubrum* Blume	Pasir-pasir	-	+	-	-	-	-	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-
	Primulaceae																												
107	*Ardisia teysmaniana* Scheff.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
	Rhizophoraceae																												
108	*Gynotroches axillaris* Blume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
109	*Pellacalyx lobbii* (Hook.f.) Schimp.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
	Rubiaceae																												
110	*Mussaendopsis beccariana* Baill	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
111	*Neonauclea purpurea* (Roxb.) Merr.	Jabon	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-
112	*Porterandia anisophylla* (Jack ex Roxb.) Ridley	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-
113	*Psychotria sp.*	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
114	*Tarenna fragrans* (Blume) Koord.& Valeton	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
115	*Timonius sericeus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rutaceae																												
116	*Melicope lunu-akenda* (Gaertn.) T.G. Hartley	Tenggek burung	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-
	Sapindaceae																												
117	*Guioa diplopetala* (Hassk.) Radlk.	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	-	-	-	-	-	-
118	*Nephelium cuspidatum* Blume	Rambutan hutan	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
119	*Nephelium lappaceum* L.	Rambutan	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
120	*Nephelium maingayi* Hiern	Rambutan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-

No.	Species Name	Region Name	TREE													SAPLING												
			1.1 Main Road Side Segment							1.2 Plantation Road Side Segment						1.1 Main Road Side Segment							1.2 Ruas Sisi Jalan Kebun					
			1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b	1a	1b	2a	2b	3	4	5	1a	1b	2a	2b	3a	3b
		hutan																										
121	*Nephelium ramboutan-ake* (Labill) P.W. Leenhouts	Rambutan hutan	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
	Symplocaceae																											
122	*Symplocos lucida* (Thunb.) Siebold & Zucc.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
	Trigoniaceae																											
123	*Trigoniastrum hypoleucum* Miq.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
	Verbenaceae																											
124	*Vitex pinnata* Linn.	Leban	-	-	-	+	+	+	+	-	-	-	-	-	-	+	-	-	+	+	-	+	-	-	-	-	-	-

Appendix 4.2 Family, genus, and species wealth was identified for every plot in the site of SGPP construction plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	TREE				SAPLING			
			1a	1b	1c	2	1a	1b	1c	2
	Anacardiaceae									
1	*Mangifera* sp.2	Mangga	-	+	-	-	-	-	-	-
	Arecaceae									
2	*Arenga pinnata* Merrill.	Enau	-	+	-	-	-	-	-	-
3	*Elaeis guineensis* Jack.	Sawit	+	+	+	-	-	-	-	-
	Euphorbiaceae									
4	*Endospermum diadenum* (Miq.) Airy Shaw	Mangkok-mangkok	-	-	-	+	-	-	-	+
5	*Hevea brasiliensis* Muell.Ag.	Rambung	-	-	-	-	-	-	-	+
6	*Macaranga gigantea* (Rcfb.f.&Zoll.) Muell. Arg.	Merkubung	-	-	-	+	-	-	-	-
7	*Macaranga javanica* (Blume) Muell. Arg	Mahang	-	-	-	-	-	-	-	+
8	*Macaranga trichocarpa* (Zoll.) Muell. Arg.	Mahang	-	-	-	-	-	-	-	+
	Leguminosae									
9	*Acacia mangium* Wild.	Akasia	-	-	-	+	-	-	-	+
10	*Afzelia rhomboidea* (Blanco) S. Vidal	-	-	-	-	+	-	-	-	+
11	*Archidendron jiringa* (Jack) I. Nielsen	Jering	-	+	-	+	-	-	-	-
	Malvaceae									
12	*Commersonia bartramia* (L.) Merr.	Empelu	-	-	-	-	-	-	-	+
	Melastomataceae									
13	*Melastoma malabathricum* Jack.	Sendudu	-	-	-	-	-	-	-	+
	Moraceae									
14	*Artocarpus elasticus* Reinw. ex Blume	Terap	-	-	-	+	-	-	-	+
15	*Artocarpus integer* (Thunb.) Merr.	Cempedak	-	-	-	+	-	-	-	+
16	*Artocarpus nitidus* Trecc.	Tempinis	-	-	-	-	-	-	-	+
17	*Ficus grossularioides*	Luwingan	-	-	-	-	-	-	-	+
	Myrtaceae									
18	*Syzygium palembanicum* Miq.	Jambu-jambu	-	-	-	+	-	-	-	-

No.	Species Name	Region Name	TREE				SAPLING			
			1a	1b	1c	2	1a	1b	1c	2
	Oxalidaceae									
19	*Scorodocarpus borneensis* (Baill.) Becc.	-	-	-	-	-	-	-	-	+
	Phyllanthaceae									
20	*Glochidion superbum* Baill. ex Muell. Arg.	-	-	-	-	+	-	-	-	+
	Poaceae									
21	*Bambusa vulgaris* Schrad. Ex Wendl	Bambu kuning	-	-	-	-	-	-	-	+
	Rutaceae									
22	*Melicope lunu-akenda* (Gaertn.) T.G. Hartley	Tenggek burung	-	-	-	-	-	-	-	+

Appendix 4.3 Family, genus, and species wealth was identified for every plot in the site of SGPP water supply channel construction plan in Industri Tenayan Village, Tenayan Raya Sub-district, Pekanbaru City.

No.	Species Name	Region Name	TREE		SAPLING	
			1	2	1	2
	Apocynaceae					
1	*Alstonia angustiloba* Miq.	Kulit pipit	-	-	-	+
	Aquifoliaceae					
2	*Ilex cymosa* Blume	Kelat putih	-	-	+	-
	Arecaceae					
3	*Caryota mitis* Lour.	Palem sarai	-	-	+	-
	Burseraceae					
4	*Canarium caudatum* King	-	-	-	+	-
5	*Santiria apiculata* A.W. Benn.	-	-	-	+	-
	Cannabaceae					
6	*Trema tomentosa* (Roxb.) H. Hara	-	-	-	+	-
	Clusiaceae					
7	*Garcinia parvifolia* (Miq.) Miq.	Asam kandis	-	-	+	-
	Cyatheaceae					
8	*Cyathea* sp.	-	-	-	+	-
	Dilleniaceae					

No.	Species Name	Region Name	TREE		SAPLING	
			1	2	1	2
9	*Dillenia excelsa* (Jack) Martelli ex Gilg.	Simpur	-	-	+	-
	Elaeocarpaceae					
10	*Elaeocarpus palembanicus* (Miq.) Corner	-	+	-	-	-
	Euphorbiacae					
11	*Hevea brasiliensis* Muell.Ag.	Rambung/karet	+	-	+	-
12	*Macaranga javanica* (Blume) Muell. Arg	Mahang	-	-	+	+
13	*Macaranga pruinosa* (Miq.) Muell. Arg.	Mahang	+	-	+	-
14	*Macaranga triloba* (Thunb.) Muell. Arg.	Mahang damar	-	-	+	-
15	*Mallotus paniculatus* Muell. Arg.	Anggrung	-	-	+	-
	Hypericaceae					
16	*Cratoxylum cochinchinensis* (Lour.) Blume	-	-	-	-	+
	Lauraceae					
17	*Phoebe laevis* Kosterm.	-	-	-	+	-
	Lecythidaceae					
18	*Barringtonia lanceolata* (Ridl.) Payens	-	-	-	-	+
	Leguminosae					
19	*Acacia mangium* Wild.	Akasia	-	+	-	+
	Afzelia rhomboidea (Blanco) S. Vidal	-	-	-	-	+
20	*Archidendron clypearia* (Jack) I.C. Nielsen	-	+	-	-	-
21	*Archidendron jiringa* (Jack) I. Nielsen	Jering	-	-	-	+
	Malvaceae					
22	*Commersonia bartramia* (L.) Merr.	Empelu	-	-	+	+
	Melastomataceae					
23	*Bellucia pentamera* Naudin	-	-	-	+	-
24	*Melastoma malabathricum* L.	Sendudu	-	-	-	+
	Moraceae					
25	*Artocarpus elasticus* Reinw. ex Blume	Terap	-	-	-	+
26	*Artocarpus rigidus* Blume	Tempinis	+	-	+	-
27	*Ficus fistulosa* Reinw. ex Blume	Ara	-	-	+	-
28	*Ficus grossularioides* Burm.f.	Luwingan	-	-	-	+

No.	Species Name	Region Name	TREE		SAPLING	
			1	2	1	2
29	*Ficus padana* Burm. F.	Bulu-bulu	+	-	+	-
30	*Ficus variegata* Blume	Gondang/Gedobuk	+	-	+	-
31	*Syzygium cymosum* (Lam.) DC.	Kelat	+	-	+	-
	Phyllanthaceae					
32	*Aporosa arborea* (Blume) Mull. Arg.	-	+	-	+	+
33	*Glochidion rubrum* Blume	Pasir-pasir	+	-	+	-
34	*Glochidion superbum* Baill. ex Muell. Arg.	-	-	-	-	-
35	*Glochidion zeylanicum* (Gaertn.) A. Juss.	Paisr-pasir	+	-	+	-
	Poaceae					
36	*Gigantochloa apus* (Schultz.) Kurz	Bambu	-	-	+	-
	Rubiaceae					
37	*Timonius sericeus* Schum	-	-	-	-	+
38	*Melicope lunu-akenda* (Gaertn.) T.G. Hartley	Tenggek burung	+	-	+	+
	Sapindaceae					
39	*Nephelium lappaceum* L.	Rambutan	-	-	+	-
	Verbenaceae					
40	*Vitex pinnata* Linn.	Leban	+	-	+	+
	Vitaceae					
41	*Leea indica* (Burm.f.) Merr.	Girang	-	-	+	-