How do People Behave towards the Environment? A Case Study of South Sumatra Province, Indonesia

by

Marpaleni

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DECLARATION

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed Marpaleni   Date: 05/08/2019

DEDICATION

I dedicate this thesis to my parents, Tugiman and Sapariah, who guided me to where I am today; and to my husband, Dedi Suprapto, who has always been motivating me to finish my study.

ABSTRACT

The Intergovernmental Panel on Climate Change (IPCC) declared in 2007 that human behaviour plays a major role in global warming and climate change (IPCC, 2007). However, information about how people behave towards the environment and what constraints they face to foster environmentally friendly behaviour (EFB) in their daily lives is limited. This thesis is based on a study aimed at filling this gap in knowledge by introducing a measure to monitor the level of environmental behaviour of the people of South Sumatra Province of Indonesia. Environmental behaviour is defined as people's daily activities that could help sustain natural resources by promoting resource conservation and waste reduction. The environmental behaviour index (EBI) is a composite index based on an initial group of 30 variables at the household level, grouped into six dimensions: (i) food consumption, (ii) housing, (iii) energy use, (iv) water use, (v) mode of transportation and (vi) waste management. The study is based on interviews with representatives of 490 statistically selected households in South Sumatra during August to October 2016. The environmentally friendly and non-friendly status of the people is decided by applying a two-thirds rule to the EBI based on data reduced by factor analysis to 15 variables and five dimensions. The concept of the two-thirds rule is adapted from Alkire and Foster (2011), who used it to define human well-being by means of a well-being index. In the present study, an EBI of 66.67 or greater on a scale of 0 to 100 (where 66.67 is two-thirds of the distance between 0 and 100) indicates environmentally friendly behaviour. The analysis of data reveals that, on a scale of 0 to 100 the overall EBI is less than 50, indicating that the people of South Sumatra are, on average not friendly to the environment. Further investigation revealed that almost 80% of the respondents scored an EBI below the friendliness line of 66.67. This shows that the state of environmental behaviour at the household level in South Sumatra is a cause for concern, as most households still behave in unsustainable ways. Among the dimensions of EBI, mode of transportation has the lowest EBI, while at the same time it contributes the most to the creation of the index (EBI). Hence this dimension needs to be improved the most. Disaggregated by demographic characteristics, this study found that women, urban dwellers, respondents of small-sized households and the elderly were more environmentally friendly than people of other demographic characteristics. Among lifestyle characteristics, respondents spending less on food, non-food and the combination of food and non-

food, respondents who did not smoke and the respondents who had access to the internet were more friendly towards the environment. Focus group discussions (FGDs) with smaller groups of respondents revealed that people had a negative attitude towards EFB as they felt that EFB was inconvenient, non-urgent, and there were other important things in life. They thought that, as long as they kept their own houses clean, it was the responsibility of other people or government agencies to keep the community environment clean. The FGDs also suggest that economic constraints, lack of public facilities, absence of knowledge and awareness as well as weaknesses in law enforcement are barriers that hinder the adoption of EFB.

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ABBREVIATIONS

Bappeda	*Badan Perencanaan Pembangunan Daerah* — Regional Development Planning Board
BI	*Bank Indonesia* — The Indonesian Central Bank
BLH	*Badan Lingkungan Hidup* — Board of the Environment
BNPB	Badan Nasional Penanggulangan Bencana — National Disaster Management Authority
BOE	Barrel Oil Equivalent
BPS	*Badan Pusat Statistik* — Central Board of Statistics — Statistics Indonesia
CB	Census Block
CBs	Census Blocks
CH_4	Methane Gas
EB	Environmental Behaviour
EBI	Environmental Behaviour Index
EFB	Environmentally Friendly Behaviour
EFP	Environmentally Friendly People
EnFB	Environmentally not-Friendly Behaviour
EnFP	Environmentally not-Friendly People
EPIC	Environmental Policy and Individual Behaviour Change
ESDM	*[Kementrian] Energi dan Sumber Daya Mineral* — The Ministry of Energy and Mineral Resources of Republic Indonesia
FA	Factor Analysis.
FAO	Food Agriculture Organisation
FGD	Focus Group Discussion
FGDs	Focus Group Discussions
GDP	Gross Domestic Product
GEB	General Ecological Behaviour
GFN	Global Footprint Network
gha	global hectares
GHG	Greenhouse Gas/Greenhouse Gases
GWh	Gigawatt Hours
HS	Household Survey
IMR	Infant Mortality Rate
IPCC	Intergovernmental Panel on Climate Change
JHS	Junior High School
KIA	*Kajian Islam Adelaide* — Islamic Working Group, Adelaide
KLH	*Kementrian Lingkungan Hidup dan Kehutanan* — The Ministry of Environment and Forestry
KMO	The Kaiser-Meyer-Olkin Measure of Sampling Adequacy
KWh	Kilowatt Hours
LPDP	*Lembaga Pengelola Dana Pendidikan* — The Indonesia Endowment Fund for Education
mamsl	metres above mean sea level

MEMR	Ministry of Energy and Mineral Resources of Republic Indonesia
Men-PPLH	*Menteri Negara Pengawasan Pembangunan dan Lingkungan Hidup* — the Ministry of Development and Environmental Supervision
MUBA	*Musi Banyuasin*
MURA	*Musi Rawas*
MURATARA	*Musi Rawas Utara*
NASA	National Aeronautics and Space Administration
NEP	New Environmental Paradigm
NVivo	NVivo Software (for analysing qualitative data)
OCM	Own-Children Method
OECD	Organisation for Economic Co-operation and Development
OI	*Ogan Ilir*
OKI	*Ogan Komering Ilir*
OKU	*Ogan Komering Ulu*
OKUS	*Ogan Komering Ulu Selatan*
OKUT	*Ogan Komering Ulu Timur*
PAF	Principal Axis Factoring
Pali	*Penukal Abab Lematang Ilir*
PBC	Perceived Behavioural Control
PCA	Principal Component Analysis
PEB	Pro-environmental Behaviour
Perda	*Peraturan Daerah* — Local Government Regulation
Permen	*Peraturan Mentri* — Ministry Regulation
Perpres	*Peraturan Presiden* — President Regulation
PLN	Perusahaan Listrik Negara — State Electricity Company
PP	*Peraturan Pemerintah* — Government Regulation
PPIA	*Perhimpunan Pelajar Indonesia Australia* — Association of Indonesian Students in Australia
PPS	Probability Proportional to Size
PRB	Population Reference Bureau
RT	*Rukun Tetangga* — Neighbourhood Association
RW	*Rukun Warga* — Neighbourhood Association (bigger than RT)
SBREC	Social and Behavioural Research Ethics Committee
SDKI	*Survey Demografi Kesehatan Indonesia* — Indonesian Demographic and Health Survey
SHS	Senior High School
SN	Subjective Norms
SOP	Standard Operational Procedure
SP	*Sensus Penduduk* — Population Census
SPPLH	*Survey Perilaku Peduli Lingkungan Hidup* — Survey of Environmentally Aware Behaviour
SPSS	Statistical Package for the Social Sciences
SRM	Social Resilience Module of Susenas
SUPAS	*Survei Penduduk Antar Sensus* — Intercensal Population Survey

Susenas	*Survey Sosial Ekonomi Nasional* — the National Socio Economic Survey of Indonesia
TFR	Total Fertility Rate
Three Rs	Reduce, Reuse and Recycle
TPA	*Tempat Penimbunan Akhir* — Final Landfill
TPB	Theory of Planned Behaviour
TPS	*Tempat Penimbunan Sementara* — Temporary Landfill
UN	United Nations
UNEP	United Nations Environment Programme
UNICEF	United International Children's Emergency Fund
USGS	U.S. Geological Survey
UU	Undang-Undang or law
VBN	Value-Belief-Norm
WHO	World Health Organisation

LIST OF VARIABLES

A1	Consuming local food
A2	Consuming fruit/vegetables
A3	Consuming imported food
A4	Consuming chicken/poultry
A5	Consuming beef
A6	Consuming fish or sea food
A7	Consuming mineral water (bottled water)
A8	Consuming home-grown food
A9	Checking leaks (piped water)
A10	Having shorter showers
A11	Using minimal water in kitchen
A12	Reuse of grey water (from washing vegetable/fruit/ rice, ablutions, etc.)
A13	Turning off electronic devices when they are not used
A14	Using firewood or any other type of biomass for cooking
A15	Covering pot/pan when cooking
A16	Using energy-saving bulbs
A17	Using public transport
A18	Using Pertamax/Pertalite (other than premium)
A19	Reducing the use of private transport
A20	Maintaining vehicle’s machinery service
A21	Conducting emission test routinely
A22	Littering
A23	Sorting the garbage at home
A24	Composting the garbage
A25	Dumping the garbage directly into drain/river
A26	Burning the garbage
A27	Toilet with septic-tank
A28	Infiltration trenches, or biopore infiltration holes, or garden/turf in the home environment
A29	Perennials/annual plants
A30	Separate bins for organic/inorganic waste.
TA3	A3 after transformation
TA4	A4 after transformation
TA5	A5 after transformation
TA6	A6 after transformation
TA7	A7 after transformation
TA14	A14 after transformation
TA22	A22 after transformation
TA25	A25 after transformation
TA26	A26 after transformation

TA27	A27 after transformation
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CHAPTER: 1 INTRODUCTION

1.1 Introduction

Human activity often impacts on the environment with costly consequences. As consumers, people do not only consume agricultural and industrial products but also drive the demand for the extraction and use of natural resources including, for example, water, timber, petroleum, coal and natural gas. Not only the usage of those commodities themselves generates emissions and waste, their associated production processes require the extensive development of factories which often create additional toxic by-products. Thus, not only does this modern consumer lifestyle result in the wide-scale pollution of land, oceans and the atmosphere (United Nations for Environment Programme — UNEP, 2017), it also contributes to climate change. This is especially true in cases where fossil fuel resources such as petroleum, coal and natural gas are extracted, produced and consumed en masse. In fact, the over-consumption of fossil fuels is especially damaging to the earth's atmosphere, intensifying the concentration of carbon dioxide, methane and greenhouse gas (GHG) emissions.

Climate change is nowadays recognised as an urgent issue and its accompanying environmental impacts have been rising on an unprecedented level. Global-scale observations of the climate system since the mid-19th century have discovered that the atmosphere and the oceans have been heating up, the snow and ice caps have been melting, sea levels have been rising, and the GHG emissions have been escalating (Intergovernmental Panel on Climate Change — IPCC, 2013). Scientific assessments conducted in various territories ascertain that this environmental catastrophe has severely impacted, not only temperature, rainfall and increased climate variability in the world, but it has also influenced changes in the quantity and the quality of water resources on earth as a result of glaciers melting (IPCC, 2014b). It further impacted on widespread species disappearance across the globe over millions of years (IPCC, 2014b). Hence, Mann (2018) argues that at the current stage the existence of climate change creates "more of a problem than we anticipated". Furthermore, corroborative evidence confirms that this environmental disaster has not just been a naturally occurring event, but is instead driven by humanity (IPCC, 2014b). In addition the current state of the modern human-induced GHG is the highest in history (IPCC, 2014b).

The findings of many studies have been disseminated all over the word to provide warnings about the alarming trends of catastrophes caused by human-induced climate change. In 2017, fifteen thousand scientists called for human moral imperatives to keep saving the environment and to help safeguard sustainable development (Ripple et al., 2017). According to these scientists, such ethical considerations possibly include an attempt to change people's individual behaviour, including limiting population growth to, ideally, the replacement level of fertility as well as decreasing consumption of GHG-emitting goods, increasing recycling and reuse of materials, and geoengineering schemes (Ripple et al., 2017). Moreover, regarding a change towards a more environmentally friendly action, the international body for assessing the science related to climate change, IPCC (2007, p. 12) noted that:

> Changes in lifestyle and behaviour patterns can contribute to climate change mitigation across all sectors. Lifestyle changes can reduce GHG emissions. Changes in lifestyles and consumption patterns that emphasise resource conservation can contribute to developing a low-carbon economy that is both equitable and sustainable.

Arguments incorporating changing behaviour to mitigate human-induced climate change are also in line with previous studies done in various countries (Aoyagi-Usui, Vinken, & Kuribayashi, 2003; Ngo, West, & Calkins, 2009; Steg & Vlek, 2009). Yet, despite the scientific evidence of human-induced climate change, some people still reject the idea that humans are causing rapid and dangerous climate change. According to these climate sceptics, climate change is just a natural phenomenon, thus the issues of "anthropogenic warming have been greatly exaggerated" (Lindzen, 2009). These people also criticise the notion of human-induced climate changes as merely "junk science" (Milloy, 1995). However, in spite of the existence of climate change scepticism; the adoption of a more sustainable lifestyle is a positive and important direction to take.

Furthermore, development of policies to encourage people to adopt a more environmentally friendly behaviour requires information on the state of environmental behaviour, of drivers of environmental behaviour and of barriers that hinder people adopting environmentally friendly behaviour (EFB). This research aims to offer fresh insights on the current state of the environmental behaviour of the Indonesian people, on the factors affecting their behaviour and on their barriers. In addition, it is also hoped that the findings of this research can provide evidence-based guidelines for policy makers to develop strategies in influencing people to become friendlier towards the environment and to reduce adverse effects on human-induced environmental damage in an Indonesian context.

This chapter gives an introduction and a background to this thesis. Section 1.2 outlines the general problems related to the continued growth of the large population of Indonesia and the existence of environmentally unfriendly practices among the people. Section 1.3 discusses the statement of the problems, followed by a justification of why this thesis selected South Sumatra as a case for the study in Section 1.4. Next, Section 1.5 outlines the gaps that the thesis aims to fill. Then, Sections 1.6 and 1.7 deal with the research questions and the objectives of the research. This chapter concludes with an elaboration on the organisation of the thesis.

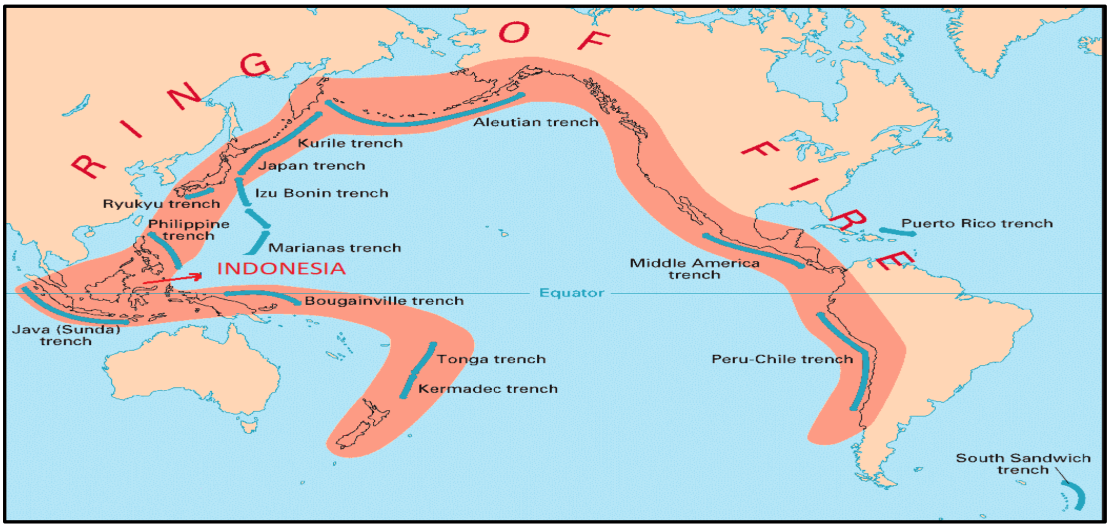
1.2 Indonesia: An environmentally vulnerable country in the midst of abundant resources

Indonesia (see Figure 1.1) is often mentioned as the largest archipelago on earth. This country consists of over 17,000 islands from small sandy islands to huge land masses such as Sumatra, Java, Sulawesi, Kalimantan, and Papua (Badan Pusat Statistik — BPS, 2017b). This Indonesian archipelago is endowed with rich natural assets including remarkable biodiversity. This biodiversity is considered to be the third largest on earth and provides important ecosystem services to the world's environment (Kementrian Lingkungan Hidup dan Kehutanan — KLH, 2016, p. 63). In addition, the country is also rich in mineral assets, such as coal, natural gas, oil, tin and gold (Ministry of Energy and Mineral Resources — MEMR, 2015), however, with increasing population and economic development the country's rich biodiversity has experienced over-exploitation (Winqvist, Dahlberg, Smith, & Berlekom, 2008). Consequently, to contribute to international efforts of dealing with climate change issues, large amounts of Indonesia's coal and other fossil fuel assets may need to remain in the ground (Jakob & Hilaire, 2015; McGlade & Ekins, 2015)[1].

Figure 1.1. Map of Indonesia.

Source: Google (2018a).

Figure 1.2. The 'Ring of Fire'.



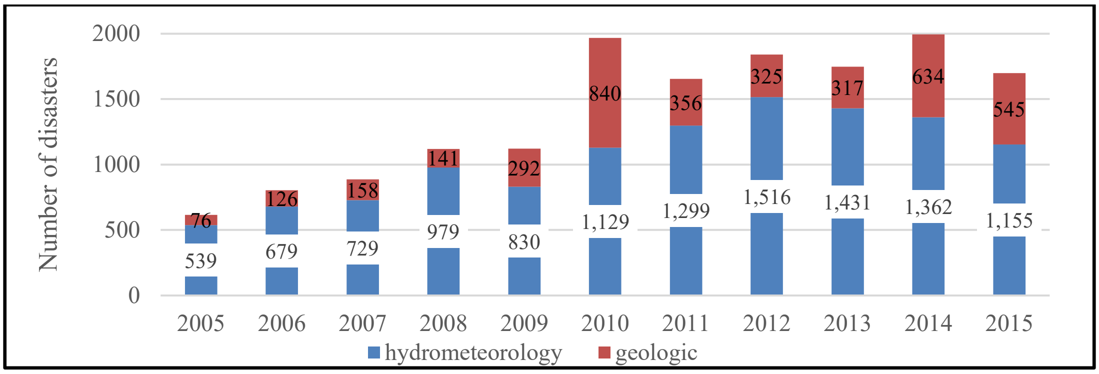
Source: U.S. Geological Survey — USGS (2014).

Geographically, the Indonesian archipelago is located in the 'Ring of Fire' (see Figure 1.2). The 'Ring of Fire' refers to a geographic area rich in tectonic activity along the edges of the Pacific Ocean, where a huge arc of volcanoes encircle and form "a nearly complete circle around the water hemisphere of the earth" (Decker & Decker, 1991, p. 19). This area stretches from New Zealand and the islands of the South Pacific, across

[1] Based on IPCC results, to prevent dangerous anthropogenic interference with the climate system, policy makers around the world have agreed to limit the global average temperature increase to 2 °C above the average global temperatures of pre-industrial times. However, to safeguard this 2 °C scenario, McGlade and Ekins (2015) suggested that a large portion of the mineral reserve (oil, coal and gas) should remain unused from 2010-2050.

Papua New Guinea, Indonesia, up to the Philippines, Japan and Kamchatka in Russia to the western edge of North and South America (Scarth, 2004; USGS, 2014). The 'Ring of Fire' is the home of three-quarters of the Earth's volcanoes (Scarth, 2004), of those, Indonesia's contribution is more than 100 active volcanoes (Sagala & Paton, 2018). This geological condition causes Indonesia to have a high potential risk for disasters such as volcanic eruptions, earthquakes with a wide range of magnitudes, and tsunamis (Badan Nasional Penanggulangan Bencana — BNPB, 2016). Besides earthquake and volcanic eruptions, historic volcano activities have also impacted on the creation of sedimentary rocks which, although fertile, are often not sturdy (BNPB, 2016, p. 15). As such, landslide disasters often occur in Indonesia's mountainous areas. According to BNPB (2016), during 2005–2015 this archipelagic country experienced 15,458 disasters with an increasing trend. These disasters include 'geologic type of disasters' such as earthquake, tsunami, volcanic eruption and landslide; and 'hydrometeorology type of disasters' such as flood, extreme tides, forest fires, drought and extreme weather. During 2005–2015, the hydrometeorology disasters accounted for more than three-quarters of all disasters occurring in Indonesia (see Figure 1.3).

Figure 1.3. The occurrence of disasters in Indonesia in 2005–2015.



Source: BNPB (2016, p. 30).

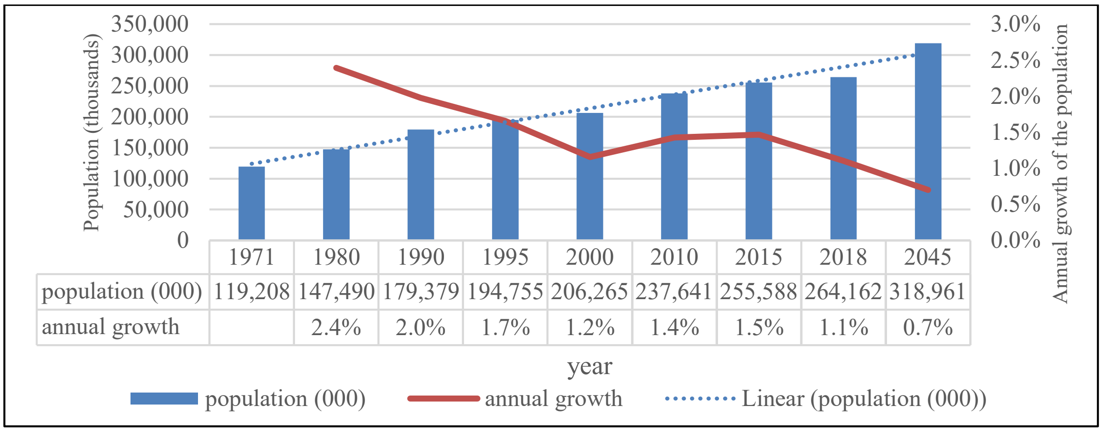
Being so vulnerable to environmental disasters, and in the presence of climate change the environmental vulnerability of Indonesia will only increase. A recent study by Samenow (2018) shows the relationship between climate change and hydrometeorology disasters. Using the case of Hurricane Harvey occurring on August 2017 in the state of Texas in the USA, Samenow (2018) reveals how climate change has been making hurricanes more intense, stronger and faster, and heavier in rain. Likewise in 2015 many regions in Indonesia experienced the worst dry season in history, accompanied by drought and extremely hot temperatures caused by the *El-*

Nino phenomena (BNPB, 2016). Following this *El-Nino* disaster, Indonesia had been struggling with incidents of floods, landslides and wind storms in 2016 (BNPB, 2017).

1.2.1 **Continuous population growth in Indonesia and its impacts on the environment**

Indonesia's population is very large. It is currently the fourth most populous country on earth, after India, China and the US (United Nations — UN, 2017). With a population of more than 261 million people in 2017, Indonesia accounted for 3% of the world's population in 2017 (BPS, 2018a; UN, 2017). In 2018, Indonesia's population was as large as 264 million people (BPS, 2018a) (see Figure 1.4).

Figure 1.4. Number and projected growth of population of Indonesia, 1971 to 2045[2].



	1971	1980	1990	1995	2000	2010	2015	2018	2045
population (000)	119,208	147,490	179,379	194,755	206,265	237,641	255,588	264,162	318,961
annual growth		2.4%	2.0%	1.7%	1.2%	1.4%	1.5%	1.1%	0.7%

Source: Drawn by the author based on BPS (2012c); (BPS, 2018a).

The large population of Indonesia is accompanied by a historic rapid rate of population growth. At the 1971 population census, the Indonesian population was 119.2 million and this number has doubled within just 39 years, to 238 million as at the 2010 population census (BPS, 2012c, 2013b). Furthermore, based on the results of the 2015 intercensal population survey or *survei penduduk antar sensus* — SUPAS, Indonesia's population is projected to reach 318.9 million by 2045 (see Figure 1.4). This implies that during 2018–2045, the population of Indonesia is projected to grow by about 0.7% per annum. The figure of 0.7% may not seem high, but on a population of 264 million in 2018 (see Figure 1.4), it leads to significant increases, as much as 1.8 million additional persons per year.

[2] Data of 1971, 1980, 1990, 2000 and 2010 were based Population Census, while data of 1995 and 2015 were based on SUPAS in that specific year. Data of 2018 and 2045 were projected by BPS Based on 2015 SUPAS.

The continuing rapid growth of an already large population is not without consequences, especially for the natural environment. Put simply, the impact of a large and growing population on the environment would be quite substantial. This is simply because more people means more demand for resources to fulfil the needs of human's daily lives (Bean, 1974; Hayes, 1997, 2010; Hayes & Adamo, 2014). These resources include food, shelter, fresh water, minerals, and energy and so on. Likewise, during the process of production to fulfil those necessities; such as processing of produced food, pumping groundwater, harvesting wood, mining minerals, and burning fuel, the natural resources would be depleted, and more pollutants would be released.

Furthermore, the rapid rate of urbanisation following the growth of population in Indonesia and some of its provinces in particular has been contributing to a set of serious problems with dire consequences. According to the 1980 census, there were eight provinces with urbanisation rates above 20%, namely North Sumatera, Riau, South Sumatera, DKI Jakarta, West Java, Yogyakarta, South Kalimantan and East Kalimantan (BPS 1980). In contrast, in 2010 there was only one province (i.e. East Nusa Tenggara) that had urbanisation less than 20% (BPS, 2010a). Accordingly, the urban population in Indonesia increased to 49.8% in 2010 and was projected to reach 66.6% in 2030 (BPS, 2010a).

This urbanisation has been exacerbating urban consumption enormously and intensifying the urban ecological problems in Indonesia. Furthermore, with an increasing level of urbanisation in an already fast-growing population, the pressure which the people put on the environment will be much too excessive.

A study by Bulkin (1996) discussed how rapid urbanisation in Indonesia had impacted on a higher and expanding pressure on lodging and basic urban facilities. The last includes fresh water supply and its distribution, the collection and the disposal of sewerage, the solid waste problem, and the drainage systems. Unfortunately, not all public needs have been fulfilled by the Indonesian's municipalities governments. According to Bulkin (1996), it was only 44 % out of the total urban population had been served by public water supplies since 1990. The condition of solid waste disposal systems and sewerage systems is even worse. The municipalities governments in Indonesia have been able to serve only 34% of the total urban solid disposal requirements and 10% of the total urban sewerage disposal requirement (Bulkin, 1996). Furthermore, Bakker (2007) discusses how Jakarta, the capital city of Indonesia, was characterised as having the weakest water and sanitation infrastructure among Asia's capital cities, since it provided little water supply and few wastewater disposal facilities to its residents.

Another excess accompanying rapid urbanisation is the large increase in energy use, which comes out of the increase in economic activity. Energy consumption, is indispensable for human daily necessity; however, the snowballing level of energy consumption leads to new environmental problems. Research by Madlener and Sunak (2011) shows that although they cover only 2% of the world's surface, urban areas are responsible for two-thirds of the Earth's energy consumption and to 70% of the world's carbon emissions. According to Sadorsky (2018) the snowballing energy consumption caused by urbanisation comes out of several channels. First, as urbanisation concentrated economic production in the cities, it also shifted economic production from less energy intensive activities, i.e., agriculture, to more energy intensive businesses, i.e. manufacturing (Sadorsky, 2018). Secondly, urbanisation increases transportation activities, for example, to transport raw materials and food to the urban manufacturing centre and the resulting manufactured foods to other destinations. This increase in transportation activity increases the demand for energy (Sadorsky, 2018). Following urbanisation, cities expanded, and their infrastructure was upgraded. The construction of new infrastructure in cities is energy consuming, because urban centres are wealthier and use more energy intensive products such as air conditioners, cars, and fridges (Sadorsky, 2018). In summary, urbanisation leads to energy use; and since this energy is mostly produced by burning fossil fuels, it will certainly increase the emission of the harmful GHG such as carbon dioxide to the atmosphere, thus contributing to climate change (Hayes, 2016).

1.2.2 **The existence of environmentally unfriendly practices at household level**

The Indonesian Central Board of Statistics (*Badan Pusat Statistik* or BPS) defines a household as a co-resident group of people who manage their consumption together (BPS, 2015f, 2016b). Based on the 2015 SUPAS, the 2015 Indonesian population of 255.2 million resided in 66.2 million households (BPS, 2015d). This number of households is projected to reach 64.7 million in 2025 as a consequence of population growth and the formation of new families/households (BPS, 2013b).

1.2.2.1 ***Household consumption and economic growth***

Concerns about the environmental impact of household consumption, such as loss of natural resources, climate change and other environmental damage caused by emissions and waste have been addressed by previous research (OECD, 2008b; Vringer, Vollebergh, Soest, Heijden, & Dietz, 2015). This household-induced environmental damage raises concerns mainly because of the patterns of household consumption. The Organisation for Economic Co-operation and Development — OECD (2008b) has projected that this will cause a significant increase in household-induced environmental issues by 2030. This is a disturbing trend for Indonesia, since household consumption remains a key driver of economic growth in the country, as evidenced by the fact that the contribution of household consumption to Indonesia's economy has historically been very large and it is increasing. From 2015 to 2017 more than half of the Indonesian economy consisted of household consumption[3] (BPS, 2015b, 2018d), indicating that households are the most significant users of natural or built-in resources in Indonesia. According to the national socio economic survey of Indonesia (*survei sosial ekonomi nasional* — Susenas), conducted in March 2017 by the BPS, household consumption per capita reached Rp[4].1, 036,497[5]/month in 2017 (BPS, 2016b, p. 39). Of this, around Rp. 527,956[6] or 50.04% was spent on food, such as cereals, prepared food and beverages, fish/seafood, vegetables, etc. The rest was spent on non-food items such as housing facilities, goods and services, clothing, etc. Thus, the behaviour of people at the household level with respect to their consumption and their treatment of the waste they generate has a significant impact on the state of the environment in Indonesia.

1.2.2.2 ***Energy consumption at the household level***

In addition, population and economic growth also stimulates demand for energy, as energy is a key factor in economic development and in providing vital services to improve people's quality of life. Over the last ten years Indonesia's energy consumption has steadily increased, from 953 million boe[7] in 2007 to 1.2 billion boe

[3] Household consumption in Indonesia accounted for 56.22 % of the total Indonesian GDP in 2017 (current prices), whereas in 2015 and 2016, the contribution of household consumption to GDP reached 56.31% and 56.62% respectively.
[4] Rupiah is the official currency of Indonesia.
[5] Equivalent to US$ 73.65 Based on BI Mild Rate as of 09 May 2018 (Bank Indonesia - BI, 2018).
[6] Equivalent to US$ 37.52 Based on BI Mild Rate as of 09 May 2018 (BI, 2018).
[7] Boe is the abbreviation of Barrel Oil Equivalent. It is calorific equivalent of a barrel of crude oil (MEMR, 2018, p. 118).

in 2017 (MEMR, 2018, p. 25). Furthermore, BPS (2017a, p. 29) quoted that total per capita energy consumption of Indonesia in 2016 was about 0.02 terajoule of energy or equal to five thousand Kwh[8] of electricity. In terms of money, that amount was equal to 10% of GDP[9] per capita (BPS, 2017a, p. 29). Multiplying that number with Indonesia's total population in 2016 produces a significant cost.

Furthermore, the generation of energy in Indonesia exerts a major pressure on the environment, both by depleting the resources and by creating pollution. It is also critical to GHG creation in the atmosphere, as Indonesia's energy was mostly produced by burning non-renewable fossil fuels, the burning of which contributes to the emission of carbon dioxide into the atmosphere. According to MEMR (2018), energy supply in Indonesia is mainly based on fossil fuels like oil and coal. In 2017, oil based energy accounted for around 35% of Indonesia's total energy supply, whilst coal based energy was around 25% (MEMR, 2018, p. 11). In the same year, renewable energy, particularly hydro and geothermal, had a share of less than 5% (MEMR, 2018, p. 11).

Compared with other sectors, such as transportation and industry, household energy consumption is the lowest. However, series data on the latest ten years indicate the share of household energy consumption continued growing, from 14.38% in 2007 to 15.45% in 2017 (MEMR, 2018, p. 26). Products of energy that household consumed the most were electricity and biomass[10]. In 2017, households consumed 383 million boe electricity and 263 million boe biomass (MEMR, 2018, pp. 46–47). This makes households the second most prominent user of electricity products (MEMR, 2018, p. 95), and the biggest user of biomass (MEMR, 2018, p. 95) in Indonesia.

Although biomass is classified as non-fossil fuels and renewable energy sources (Basu, 2018; Klass, 1998), the burning of biomass without installing a specific technology i.e. the carbon capture and storage (Vaughan et al., 2018) is not emission free. When combusted, biomass releases its carbon content to the atmosphere, which contribute to air quality degradation and then affects residential health (Mestl, Aunan, & Seip,

[8]KWh is the abbreviation of Kilowatt Hour.

[9]GDP is the abbreviation of Gross Domestic Product.

[10]Biomass is a kind of renewable organic based fuel. Among the kinds of biomass are firewood (wood and wood waste), agriculture waste (rice hulks, rice straws, palm fronds, coconut shells, etc.), urban solid waste, and industrial waste (MEMR, 2018, p. 110). Biomass refers to any organic material that is derived from plants and animals, as such it is not necessarily solid. However, biomass does not include organic materials that over millions of years have been transformed by geological processes into fossil fuels (Basu, 2018, p. 49).

2007). In addition, exploitation of energy from woody[11] biomass also risks sacrificing natural areas as it leads to deforestation (Field, Campbell, & Lobell, 2008). In addition, the combustion of a secondary type of biomass, such as waste biomasses in the landfill, produces methane, another type of GHG (Basu, 2018, pp. 57–58).

Figure 1.5. A traditional kitchen in Air Lingkar Village of South Sumatra that uses biomass as its cooking fuel, on September 2016.

Source: Private collection.

Generally, biomass is the traditional source of energy for cooking, lighting and heating in rural areas of Indonesia. In 2017, biomass had a share of around 18.6% (MEMR, 2018, p. 11). Although the contribution of biomass as the source of energy in Indonesia continues to decline its contribution to energy's generation in Indonesia is still prominent. In 2007–2010 its contribution was more than 20%, which then fell to below 20% ever since (MEMR, 2018, pp. 10–11). Likewise, according to BPS (2016d), around 30% of Indonesian households were using solid fuel, such as firewood, charcoal, coal, coconut shells, etc. for cooking in their kitchens (Figure 1.5) in 2015. Most of these solid fuel users, lived in rural areas (BPS, 2016d).

Indonesia's household consumption of electricity amounted to more than 94,000 GWh[12] or 42% of total of electricity sales in 2017 (MEMR, 2018, p. 95). This amount of consumption was bigger than any other sectors, making the household sector the biggest electricity consumer in Indonesia in 2017 (see MEMR, 2018, p. 95). It is important to note that most of Indonesia's electricity is generated by fossil fuel, i.e. coal, oil and gas (MEMR, 2018, p. 91). The burning of which contributes to the emission of carbon dioxide in the atmosphere. Thus, large amounts of energy used in

[11]Woody biomass include tress, bushes and shrubs (Basu, 2018, p. 55).
[12]GWh is the abbreviation of Gigawatt Hours.

the form of electricity are liable to worsen human-induced climate change impacts. With the continuing growth of population and increasing numbers of households, the amount of energy produced by burning fossil fuels will only exacerbate the negative impacts of human-induced climate change.

1.2.2.3 *Household and garbage disposal*

Many areas in Indonesia do not have access to proper residential garbage management. According to the 2014 Village Potential Census, around 65.1%[13] of Indonesian villages still practice open-burn/backyard burn as a way to dispose of their residential garbage (BPS, 2014b, pp. 11,39). This figure is slightly higher than that of 2011, according to which about 62.8 % of the Indonesian villages indulged in such practices (BPS, 2011b, pp. 9,48). A combination of factors causes such an increase. Those factors include the growth of the population, lack of access to garbage collection, the absence of official landfill facilities and the shortage of services that recycle solid waste. Other factors that also motivate the adoption of this type of waste management may involve convenience, habit, and cost avoidance. This type of backyard burning of residential solid waste (see Figure 1.6) often creates emissions that are released at the ground level. Additionally, the low combustion temperature and oxygen-starved conditions associated with backyard burning may result in incomplete combustion and increased pollutant emissions.

Figure 1.6. Backyard burning as a disposal related to household garbage in South Sumatra on September 2016.

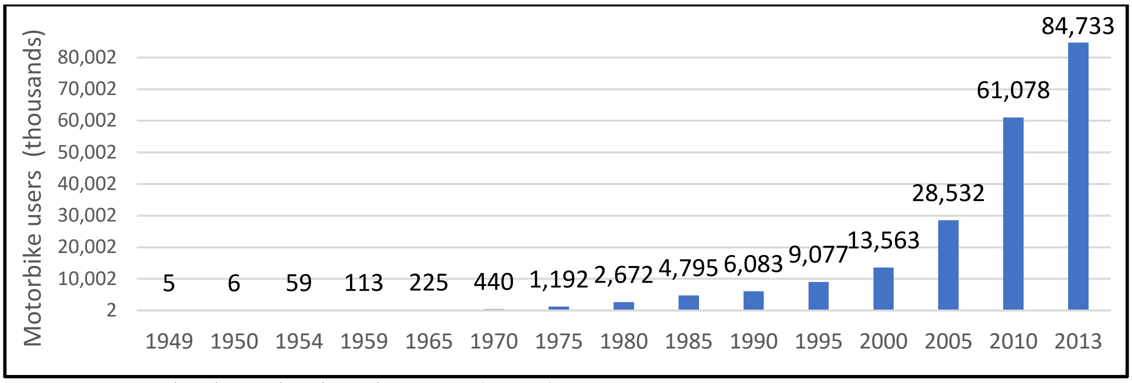
Source: Private collection.

1.2.2.4 *Household and transportation*

[13]The 2014 Village Potential Census reported that 53,491 out of the 82,190 villages in Indonesia adopted open-burn/backyard burn as a way to dispose of the household garbage (BPS, 2014b, pp. 11,39)

The current trends of urbanisation in Indonesia are more alarming with regard to climate change, because they are giving an increasingly important role to private-motorised transportation to the detriment of public transportation. Currently millions of Indonesians use private-motorised transportation such as motorbikes because public transport, such as buses, mini-buses or trains, cannot cope with the transportation demands of the population. The number of motorbike users has jumped significantly from around 5,000 in 1949 to 85 million in 2013 (see Figure 1.7), and it is predicted to continue growing.

Figure 1.7. The growth of motorcycles as a mode of transportation in Indonesia.



Source: Drawn by the author based on BPS (2015c).

There are many factors which have contributed to this increase. Significant among them are economic factors such as affordable prices of motorcycles vis-à-vis people's income. Other factors include infrastructure conditions. As a mode of transport, motorcycles are very useful in negotiating congested roads and convenient for Indonesia's tropical climate. However, the use of motorcycles for passenger transportation also has its consequences. Compared to other modes of mass public transport such as buses or trains, motorcycles are generally less energy-efficient. According to Banister (2009) high-occupancy public transport (including rail, bus, tram, and metro) consumed less energy per passenger than motorcycles, which implies a lesser contribution to the per capita air pollution, fuel use and contribution to global warming. Furthermore, according to BPS (2016c, p. 206), the emission of CO_2 from motorised vehicles in Indonesia increased from 53.7 million tonnes in 2000 to 69.6 million tonnes in 2014. Moreover, the per capita monthly expenditure on private motorcycle fuel is the highest among fuel expenditure on all modes of motorised transportation. The Susenas conducted in September 2014 noted that the per capita expenditure on gasoline for motorcycles was about Rp.34,139[14] per month, which was almost twice the per capita expenditure on gasoline for public transport (BPS, 2015a).

1.3 **Statement of the problem**

Indonesia's population is large — with a current population of more than 260 million, it is the fourth largest in the world. This population is growing and rapidly urbanising. Besides, Indonesia's economy is also growing fast at the rate of 5% annually (BPS, 2018b). The increasing population, increasing urbanisation and the fast-growing economy creates ever increasing demands on natural resources and energy resulting in increasing consumption, and increasing waste.

Whereas humans depend on the environment for their survival, their increasing consumption and waste production creates increasing negative impacts on the environment. These impacts are likely to intensify over the coming years with the influence of the climate change and the fact that in their daily life, the Indonesian people have been practicing environmentally unfriendl*y* behaviour. Some of these behaviours at the household level include the use of solid fuel for cooking, choice of private modes of travel (BPS, 2015c), the options of garbage disposal by burning (BPS, 2014b, pp. 11,39) or the increasing use of non-renewable sources for producing electricity (BPS, 2017a), all of which make considerable negative impacts on the environment. This shows that, to some extent, the Indonesian people, through their behaviour have contributed to the increase in the amount of pollutants such as GHG in the atmosphere.

The above-mentioned facts confirm that Indonesian households need to rethink their lifestyle by reducing their consumption, the manner in which they consume and their behaviour in waste disposal to help conserve the environment. In other words, they need to engage in environmentally friendly behaviour (EFB). Unfortunately, the awareness on how some changes in behaviour at the household level can make a significant positive impact on the environment and well-being, is extremely low.

[14]Equivalent to US$ 2.43 as of 09 May 2018 (BI, 2018).

1.4 **The province of South Sumatra as a focus of this study – Why South Sumatra?**

What has been mentioned about Indonesia in general is also true for South Sumatra Province, as will be discussed in detail in Chapter 4. This thesis specifically aims to investigate to what extent the people of South Sumatra apply environmental behaviour in their daily lives.

South Sumatra is the ninth most populous province in Indonesia with population growing at the rate of 2.3% per annum between 1971 and 2015. The population of South Sumatra more than doubled between 1971 and 2010, from 2.9 million to 7.5 million. It further grew to 8.1 million as at the 2015 SUPAS. South Sumatra's population is projected to continue growing to reach 9.1 million in 2025 (BPS, 2018a), adding to the increase of the population pressure on the environment for housing, transportation, drinking water, etc.

South Sumatra is selected as a case study because this province is classified as a disaster-prone area. Being located in Sumatra Island, which is directly traversed by the Sumatran active fault lines segments, this area is prone to earthquake disasters and landslides (Naryanto, 1997; Natawidjaja, 2007). However, according to BNPB (2018a), the most common natural disasters that occur in this region include floods, typhoons, fires, landslides and drought. Floods occur mainly due to the overflowing of several rivers during the rainy season, while catastrophic fires often occur from forest fires due to the practice of land clearance as a cheaper way to clear the mostly peatland forest for new planting. In 2010–2018 South Sumatra experienced floods as many as 235 times, fires 207 times and typhoons 146 times (BNPB, 2018a). These disasters have left dozens of people dead/missing and thousands suffering and displaced. These natural disasters do not happen as stand-alone phenomena, rather they happen continuously. Mistakes on the application of natural resource management practices can be considered as the largest contributors to the occurrence of natural disasters in this province.

In addition, South Sumatra is selected because of accessibility/familiarity reasons. Since it is the location where the researcher was born and is currently living and working, the researcher is very familiar with South Sumatra's complex problems on the ground as well as challenges and opportunities that local people face in their daily life. Moreover, the selection of South Sumatra as a case study is expected to further strengthen the research capacity of BPS — Statistics South Sumatra (the institution where the researcher is currently working), by improving the availability of quality statistics for the betterment of sustainable environmental management in the area. For example, as this research adopts its sampling frame from a periodically monitored survey, its indicators can be monitored periodically in future and compared across regions and time. In future, this research can possibly be extended to other provinces in Indonesia, to provide a geographical map of the level of environmental behaviour across the country.

1.5 **Gaps**

Discussions about the urgency for environmental preservation intensified after the industrial revolution, which is considered as the starting point for humans exploiting natural resources to promote economic growth (Carter, 2018; Sachs, 2015). As the human population on this earth has increased almost nine fold from the beginning of the industrialisation era (Sachs, 2015), consequently, people's daily necessities for food, housing, fresh water, clean air, fuel, etc. have increased enormously. This increases the population pressure on natural resources and threatens the environment's carrying capacity.

Realising the negative consequences of climate change for human existence and the welfare of future generations, researchers have started recognising the importance of understanding the root causes of people's unfriendly behaviour towards the environment in attempts to formulate strategies to make people's behaviour friendlier to the environment. This has led to the emergence of ideas about frameworks focusing on addressing public challenges in adopting environmentally friendly behaviour or EFB (Howes et al., 2017). Attempts to change public behaviour should not only address the behaviour itself, but should also consider the norms, values and belief as basic considerations of one's behavioural choice (Fransson and Gärling 1999). Fransson and Gärling (1999) go on to argue that a lack of awareness among the public about the impact of environmentally unfriendly activities on the welfare of current and future generations influences the lack of success of current interventions attempting to change people's unfriendly behaviour. This argument pointed to the importance of addressing the drivers of people's EFB in relation to local knowledge, concerns and understanding about the consequences of environmental destruction for the environment and the welfare of future generations.

There is already a considerable amount of research concerning environmental behaviour both theoretically and empirically, but these studies have not yet covered Indonesia. Since 2008, National Geographic and Globescan (2014) have initiated a survey to observe sustainable consumption worldwide, with internet-based respondents from 17 countries. However, Indonesia was not listed in their sampling area. Furthermore, OECD (2008, 2013) have also conducted research on greening households which interviewed one thousand households in each of several countries across the globe but again Indonesia was not selected in their sample.

Up to 2016 when this thesis took place, there has not been much research aiming to evaluate the level of environmental behaviour in Indonesia, and such studies can be considered to be rare in South Sumatra. In fact, two nationwide surveys were conducted in Indonesia to collect data on people's environmental behaviour at the household level (BPS, 2012b, 2013a). These surveys, called SPPLH (*Survei Perilaku Peduli Lingkungan Hidup* or Survey of Environmentally Aware Behaviour) were conducted by BPS (Indonesian Board of Statistics) in 2012 and 2013 (BPS, 2012b, 2013a). Respondents were asked about their daily behavioural action in the area of housing, energy, waste management, water usage, and transportation usage and community service. Some residents of South Sumatera were also included in the samples for these surveys. However, after 2013 those surveys were no longer conducted due to budget-cuts. Furthermore, results of these surveys (see BPS, 2012b, 2013a) did not provide a composite measure as the summary of the environmental behaviour performance of the people within the above multidimensional areas that is comparable across times and regions.

It cannot be denied that it is very important and necessary to collect data on a regular basis, in particular information about people's behaviour about their consumption and waste disposal, so that the same can be utilised to formulate strategies and actions to reduce the impact of human activities that contribute to climate change. Examining local actions and responses towards environmentally sustainable behaviour is important because these can help to identify more precisely what support people require to strengthen their sustainable behaviour. In addition, it will also help to identify specific constraints that different actors and groups face and obtain a more holistic understanding of adaptation in particular socioeconomic, political or historical contexts. Drawing on local perceptions, policy makers would be better informed of the conditions on the ground, the challenges and opportunities that people face in modifying their livelihoods, and what further assistance should be provided to them to make them more environmentally friendly.

In addition, given that Indonesia has a very large and growing population, this country requires a continuous monitoring of information in relation to environmental behaviour related features that are comparable across time and regions. The present research, focusing on the province of South Sumatra as a case study, is expected to assist in meeting such necessities by providing a pilot project about the development of EFB in the country and its relation to socioeconomic features, including their demographics and lifestyles, of South Sumatera, which later can be adapted in other provinces to suit the norms and practices of each province/region of this culturally diverse country.

1.6 The research questions

The main research question of this thesis is why do people behave and interact with the environment in the way demonstrated above, with particular reference to the province of South Sumatra, Indonesia and to what extent do the people of different socioeconomic groups in the province across exhibit good environmental behaviour in their daily lives?

As a part of addressing this research question, this thesis seeks to introduce an index to monitor people's environmental behaviour, namely the Environmental Behaviour Index (EBI) in the Indonesian context by taking South Sumatra as a case study. A periodically monitored EBI would help in determining whether any intervention to modify people's environmental behaviour has been successful, to provide knowledge about which groups of individuals should be targeted for modifying their environmental behaviour or whether mounting group-specific interventions are worthwhile. In the light of this, and the background discussion presented above, this thesis has the following general research question, namely:

The specific research questions are as follows:

1. What is the current level of environmental behaviour in South Sumatera and how friendly is it towards the environment?
2. What distinguishes the environmentally friendly people of South Sumatra from those who are environmentally not friendly?
3. Do people's socioeconomic characteristics (demographic and lifestyle characteristics) have a role in these differences?
4. Why do people behave with the environment in the way they do?

This thesis uses the expression 'environmentally friendly' behaviour as a specific term for a more positive environmental behaviour which should be displayed by the people in their daily life in order to maintain a good quality of the physical environment. The term environmentally 'friendly behaviour' is not meant to be a normative or a loaded expression, but it is simply meant to distinguish it from a broader environmental behaviour used in the proposed Environmental Behaviour Index. The expression "environmentally friendly behaviour" has been used in several peer-reviewed publications in environmental studies, for example: Cheah and Phau (2011); Dolnicar and Grün (2009); Han, Hsu, and Sheu (2010); Laroche, Bergeron, and Barbaro-Forleo (2001); Meijers and Rutjens (2014); Thøgersen and Ölander (2003); and Venhoeven, Bolderdijk, and Steg (2016).

1.7 **Objectives of the research**

Attempting to answer the research questions above, this thesis develops the following objectives:

1. To gather information about people's environmental behaviour with respect to key consumption items and waste disposal to support their lifestyle in South Sumatra.
2. To gather information about the demographic and lifestyle characteristics of the representatives of the selected sample of households surveyed in South Sumatra.
3. To develop an environmental behaviour index — EBI, a composite measure that can be used to monitor people's environmental behaviour at the micro, meso and macro level in South Sumatra. Micro-level refers to the individual (unit of analysis) level, the meso-level refers to the level of each dimension of environmental behaviour and the macro-level refers to the provincial level.

4. To introduce an approach to distinguish the environmentally friendly and the not-friendly group.
5. To examine the relationship of EBI with demographic and lifestyle factors in South Sumatra, and
6. To understand the reasons behind the adoption or the non-adoption of environmentally friendly behaviour (EFB) in South Sumatra

1.8 **Organisation of the thesis**

This thesis is structured in a conventional thesis format. After this introduction in Chapter 1, this thesis contains eight subsequent chapters. **Chapter 2** reviews the literature in the area of population and environment and theories related to environmental behaviour. In addition, this chapter also reviews the method of environmental behaviour measurement per se and on the current debate about the determinants of environmental behaviour according to relevant literature. **Chapter 3** outlines the research methods used to answer the research questions. This chapter discusses the research design including sample selection, quantitative and qualitative data collection and methods of analysis in general covering the general aspects of Objectives 1 to 6. **Chapter 4** contains the findings from an analysis of the secondary data to lay the background information about the significance of population, environment, and environmental behaviour problems in South Sumatra (Objective 1). **Chapter 5** explains the step by step process of the development of EBI — the Environmental Behaviour Index as a composite index for monitoring people's environmental behaviour and the Friendliness Line as an indicator to distinguish the environmentally friendly and not-friendly people (the specific methods to address Objectives 3, 4 and 5). **Chapter 6** discusses the EBI — the Environmental Behaviour Index in South Sumatra Province at micro, meso and macro levels (analysis and interpretation of findings related to Objectives 3 and 4). **Chapter 7** examines the demographic and lifestyle characteristics that distinguish between the environmentally friendly and not-friendly people of South Sumatra (Objective 5). **Chapter 8** discusses insights gained from focus group discussions (FGD) including the attitude and the subjective norms and barriers that people face to maintain EFB in South Sumatra (Objective 6). Finally, **Chapter 9** synthesises the major findings of this thesis and outlines suggestions for further research and policy recommendations.

CHAPTER: 2 LITERATURE REVIEW

2.1 Introduction

The present chapter reviews relevant literature in the area of population and the environment and environmental behaviour (EB). Keeping that in mind, this chapter is organised as follows. Following the introduction in Section 2.1, a review of literature in the area population and environment is provided in Section 2.2. A review of theories in the area environmental behaviour (EB) is given in Section 2.3, followed by a review of relevant literature related to EB measurement in Section 2.4. Section 2.5 provides overviews of the current debate on the determinants of EB, and the final section (Section 2.6) presents a summary of this chapter.

2.2 Population growth and environmental degradation

The first modern expansion of the world's global population started around 1750, after the industrial revolution, and thereafter the population has been increasing. According to Sachs (2015) the world's population in 2015 was nine times of the population at the beginning of the industrialisation era. The United Nations (UN) projected that in 2017 the world's global population is estimated to have reached more than seven billion and it is projected to grow to reach nearly 10 billion by 2050 (UN, 2017).

As the population increases, it creates more consumers of natural resources, thus escalating the pressure that humans put on natural resources (Chew, 2001; Hayes, 1997; Hayes & Adamo, 2014; Sachs, 2015). In the fishery area for example, the Food and Agriculture Organisation (FAO) investigated that from the 1950s to 2016 the global production of fisheries and aquaculture increased nearly eightfold (FAO, 2018, p. 3). In addition, the total fish production of almost 180 million tonnes in 2016 was the greatest ever, and roughly 90% of that was directly utilised for human consumption (FAO, 2018, p. vii). Such pressure will severely threaten the marine environment's carrying capacity.

Malthusians consider that the rate of population growth exceeds the degree of earth's ability to feed people, with the consequences of famine, war and disease. As preventive checks, Malthus (1798) advocated self-control (voluntary abstinence or postponed married) as a solution to reduce population pressure to avoid poverty. Neo-

Malthusians advocate birth control as an idea of restricting population growth to avoid environmental degradation (Soloway, 2017). In contrast to Malthusians, Boserup (1991) argued that population growth will stimulate agricultural innovation. This meant that the growing populations would adjust and adapt to meet their current food and other resource needs. On the other hand, Newbold (2017) argues that it cannot be said that population growth is not an issue in environmental degradation. According to Newbold (2017, p. 268), it is true that a relationship between population growth and environmental degradation is clear, however, population growth is not the sole cause of environmental degradation.

The other causes of environmental deterioration include the quantities and types of natural resources and processed goods being consumed. The number of people living in developed countries is significantly smaller compared to that living in developing countries (UN, 2017, p. 1). Only around 16% of the global population in 2017 lived in Europe (742 million) and Northern America and Oceania (402 million) (UN, 2017, p. 1). In sharp contrast, the levels of consumption of this population make a huge drain on global resources. Studies indicated that people in industrialised countries consume resources at a much higher rate per capita than people in the developing world (Giljum, Behrens, Hinterberger, Lutz, & Meyer, 2008; Hirschnitz-Garbers, Tan, Gradmann, & Srebotnjak, 2016). According to Giljum et al. (2008, p. 211), the per capita natural resource extractions of three industrialised countries, Australia, Canada and the US were the highest across the globe. Their natural resource consumption per capita was estimated to rise to approximately 32 tonnes per capita in 2020 from 28 tonnes per capita in 1995 (Giljum et al., 2008, p. 211). This rise is mostly due to the intensified mining of coal, iron and construction metals. On the other hand, as estimated by, (Giljum et al., 2008, p. 211) per capita resource extraction of people in developing countries such as India, Indonesia, Thailand, Turkey, etc will reach nine tonnes per person by in 2020.

In the 1970s Erlich called for attention on the issues of the link between population and the environment by introducing the formula I = PAT to measure the environmental impact of population on the environment (Ehrlich & Ehrlich, 2008, 2009). According to this formula, humans' impact on the environment (I) is the product of population (P), affluence (A) and the impact of technology (T); or I = PAT (Ehrlich & Ehrlich, 2008). Going by the existing situation, population growth undoubtedly implies an increase in the global consumption, which will obviously increase humans' environmental impact and pressure on the global environment. However, later modifications to this formula allow for mediating factors in the relationship between population and the environment (De Souza, Williams, & Meyerson, 2003, p. 15). These mediating factors comprise public policies, political institutions, and cultural factors. Quite often cultural norms, attitudes about the environment and civic responsibility can reduce environmental problems. It is in this context that people's environmental behaviour (EB) becomes important in lessening the impact of human consumption and waste on the environment.

Another measure for human environmental impact is the ecological footprint measure (GFN, 2018), which looks at how much natural resources a country has taken versus how much it actually possess. A discussion on ecological footprint is discussed in Section 2.4.

2.3 **Environmental behaviour theories**

Public awareness over the urgency of environmental preservation had been growing up for centuries. According to Chew (2001, p. 1) the chronicles of the ancient kingdoms, empires, and states depicted the history of environmental degradation, as mentioned by Plato, Lucretius, and Caesar illustrating soil erosion as problems of the classical world (Wall 1994 in Carter, 2018). The erosion of the soil and deforestation were also acknowledged as probable causes of the ruin of the Mayan Empire hundreds of years ago (Ponting 1992 in Carter, 2018).

Nevertheless, discussion on environmental behaviour intensified much later, after the industrial and scientific revolutions took place in the eighteenth and nineteenth centuries (Carter, 2018). The industrial revolution has been considered as the starting point for environmental degradation as this revolution accelerated resource consumption, urban development and pollution (Carter, 2018; Sachs, 2015).

Currently, research examines the relationships between human actions and the impact of these activities on natural or built environment is abundant. Such research has grown since 1970s, when various studies acknowledged the significance of public attitudes towards environmental issues (Arbuthnot & Lingg, 1975; Arbuthnot et al., 1976; Borden & Francis, 1978). Starting from that period, various theoretical frameworks have been built as tools to explain, predict, and enhance the understanding of human's conservation behaviour and factors that influence such behaviour.

Various authors have suggested the potential attitudinal factors to explain the phenomena behind environmental behavioural (Dunlap & Van Liere, 1978; Weigel & Weigel, 1978). According to Weigel and Weigel (1978), attitudinal concerns over environmental quality would predict the relevant behavioural because human's belief and feeling about ecology influence human's predispositions to engage or not engage in environmentally friendly behaviour. Weigel and Weigel (1978) also introduce a measure called the environmental concern scale as a tool to assess the general environmental attitudes of the people. The empirical studies conducted by Weigel and Weigel (1978) across USA exhibited a satisfactory internal consistency and high correlation test, which confirm the validity of the introduced measure.

Meanwhile, Dunlap and Van Liere (1978) argue that the ecological worldview over the relationship between humans and the environment can be classified into three areas of beliefs: the balance of nature, limits to growth and anthropocentrism. Then they introduce the concept of 'new environmental paradigm (NEP)' to assess the general ecological worldview of the people (Stern, Dietz, & Guagnano, 1995). According to this approach, the balance of nature refers to beliefs about humanity's ability to upset the balance of nature. Whereas, limits to growth refers to beliefs about the existence of limits to growth for human societies and lastly anthropocentrism refers to the belief that nature exists primarily for human use and has no inherent value of its own. The empirical studies conducted by Dunlap, Van Liere, Mertig, and Jones (2000, p. 427) showed high internal consistency and validity for segregating the environmentalists and the wider population. In 2000, Dunlap et al. (2000, p. 432) updated the beliefs area into five areas by adding the notion of "human exceptionalism" — refers to the idea that humans are superior species who are exempt from the laws of nature, and the risk of an "ecological crisis" — refers to awareness to catastrophic environment disruption. For that, 12 statements introduced in Dunlap and Van Liere (1978) were developed into 15 statements (Dunlap et al., 2000).

Other authors have also suggested the potential of norms to enlighten the phenomena behind environmental behavioural. Cialdini, Reno, and Kallgren (1990) introduced a theory of normative conduct, which argues that individuals' decisions to act friendly towards the environment should be motivated by social norms when these norms are activated. Empirical evidence shows that norms do have a considerable impact on behaviour. Studies by Cialdini et al. (1990) shows that littering behaviour in public places is widely influenced by injunctive norm. Furthermore, Cialdini (2003) also discovered that people littered in an area that is already highly littered.

Schwartz (1977) developed the Norm-Activation Theory of Altruism to understand human willingness in helping environmental conservation. According to Schwartz (1977, p. 222), altruistic motivation refers to "intentions or purposes to benefit another as an expression of internal values". This motivation appears in reaction to individual moral norms that are activated in persons who believe that specific conditions pose risks to others (awareness of adverse consequences) and actions they could pledge could avert those consequences (attribution of responsibility to self). A study by Ewing (2001) found that altruistic and egoistic motives are significantly related to preferences related to recycling activities in Montreal, Canada. Furthermore, Stern, Dietz, Abel, Guagnano, and Kalof (1999) suggested that personal norms (awareness of adverse consequences and attribution of responsibility to self) builds predispositions to support environmentally friendly actions.

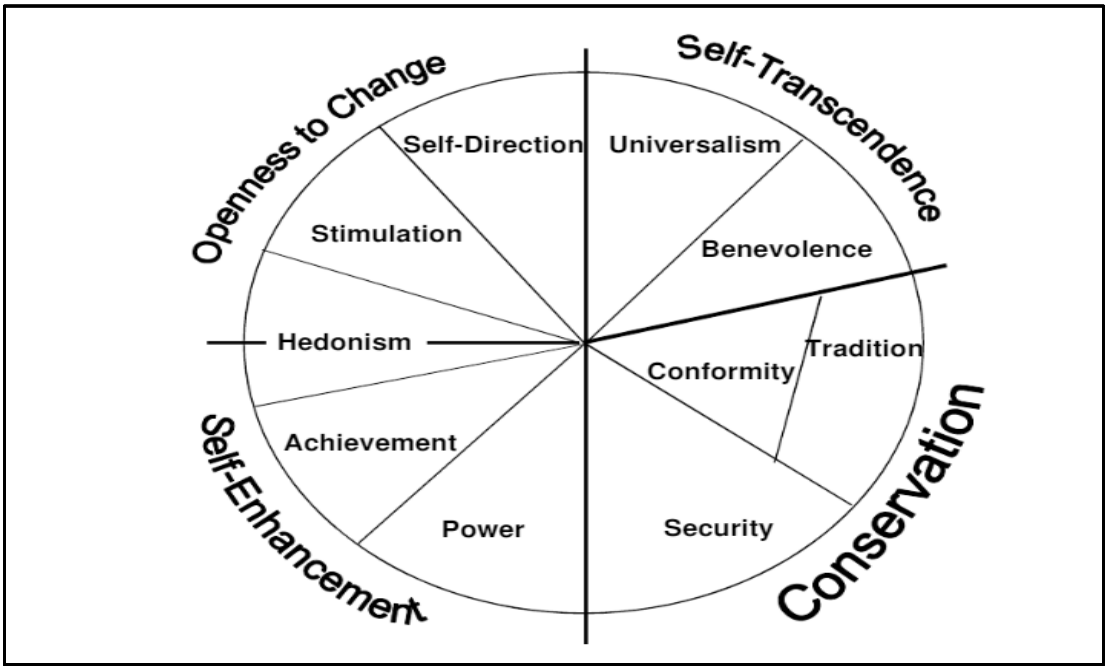
Previous publications have also suggested the potential of values as a principle guide in the life of a person or other social entities to motivate personal attitude and behaviour across cultures. According to Schwartz (1994, p. 20), values refer to "a belief pertaining to desirable end states or modes of conduct, that transcends specific situations, guides selection or evaluation of behaviour, people, and events, and is ordered by importance relative to other values to form a system of value priorities". As such, people's behaviour is motivated by a specific value they hold or they want to promote (Schwartz, 1994). According to Schwartz (1994), values across culture can be classified into ten types, each type of values expressing different goals or motivations which are described in Table 2.1. However, the aforementioned values hold dynamic relationships in ways where some values are compatible while some others are conflicting each other (Schwartz, 1994). The conflicts and compatibility among those ten values create a pattern circulating around four clusters of values as it is described Figure 2.1.

Table 2.1. Values and their subsequent goals according to Schwartz's theory of basic values.

Value		Defining goals
1.	Self-Direction	Independent thought and action–choosing, creating, exploring
2.	Stimulation	Excitement, novelty, and challenge in life
3.	Hedonism	Pleasure or sensuous gratification for oneself
4.	Achievement	Personal success through demonstrating competence according to social standards
5.	Power	Social status and prestige, control or dominance over people and resources
6.	Security	Safety, harmony, and stability of society, of relationships, and of self
7.	Conformity	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms
8.	Tradition	Respect, commitment, and acceptance of the customs and ideas that one's culture or religion provides
9.	Benevolence	Preserving and enhancing the welfare of those with whom one is in frequent personal contact (the 'in-group'
10.	Universalism	Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature

Source: Schwartz (1994).

Figure.2.1. The relations among Schwartz's ten basic values.



Source: Schwartz (1994, p. 24).

The first cluster in Schwartz's theory of basic values is openness to change, which includes self-direction and stimulation, from values that emphasise tradition and conformity (see Figure 2.1). This cluster conflicts with conservative value so that it is held by the second cluster, i.e., conservation that includes conformity, tradition and security. The third cluster includes values that stress the interests of others, society and nature, such as universalism and benevolence. The last cluster is self-enhancement which includes values that emphasise on self-interest, such as power and achievement. This self-transcendence versus self-enhancement dimension is comparable to the distinction between pro-social (or altruistic) and pro-self (or egoistic) values discussed in the previous paragraph. An empirical investigation by Schultz et al. (2005) shows that egoistic concerns are positively correlated with self-enhancement and negatively with self-transcendence. In contrast, biospheric concerns are negatively correlated with self-enhancement and positively correlated with self-transcendence. However, people also often break their social norms for practical reasons. Another study by Schultz (2001) discovered that the distance to official rubbish containers was the strongest predictor of littering in ways that people are more likely to litter the farther away they are from a rubbish container.

By adopting the altruistic-norms theory, Stern, Dietz, and Kalof (1993) developed three value orientations of an ecological worldview, i.e. social-altruistic, biospheric and egoistic, to predict environmental attitude and behaviour. Social-altruistic or humanistic value orientation refers to a concern for the welfare of other human beings while biospheric value orientation refers to a concern with non-human species or the biosphere. According to Stern et al. (1993, p. 327), human's environmental attitude is the combination of these three value orientations. Next, Stern et al. (1999) integrated the concepts of NEP and the norm activation theory to develop a value-belief-norm (VBN) theory of environmentalism. The theory proposes that approval of the NEP is formally an initiator to awareness of consequences in the norm activation model. The degree of approval of the NEP is itself associated (positively) with biospheric and altruistic values and (negatively) with egoistic values.

Aiming to explain psychological factors that can influence EB, Ajzen and Fishbein (1977), introduced the theory of reasoned-action (TRA) as a tool to understand a range of behavioural decision making contexts. TRA comprises a model that combines information and motivation variables to predict behaviours. According to this theory, the most direct predictor of behaviour is behavioural intentions, or "readiness to engage in a given behaviour" (Fishbein & Ajzen, 2011, p. 43). This intention is, however, a function of people's attitude toward the behaviour and their subjective norms. Subsequently, Ajzen (1991) added a variable called perceived behavioural control (PBC) to the TRA, resulting in the theory of planned behaviour (TPB).

According to TRA and TPB, attitudes refer to the overall positive or negative evaluation of performing the behaviour. They comprise two factors, i.e. the evaluation of that attitude and the strength of the belief that supports the evaluation (Ajzen, 1991; Ajzen & Fishbein, 1977). Hence, if people strongly believe that a behaviour will be followed by more positive than negative consequences, these people will hold the attitude to favour the behaviour.

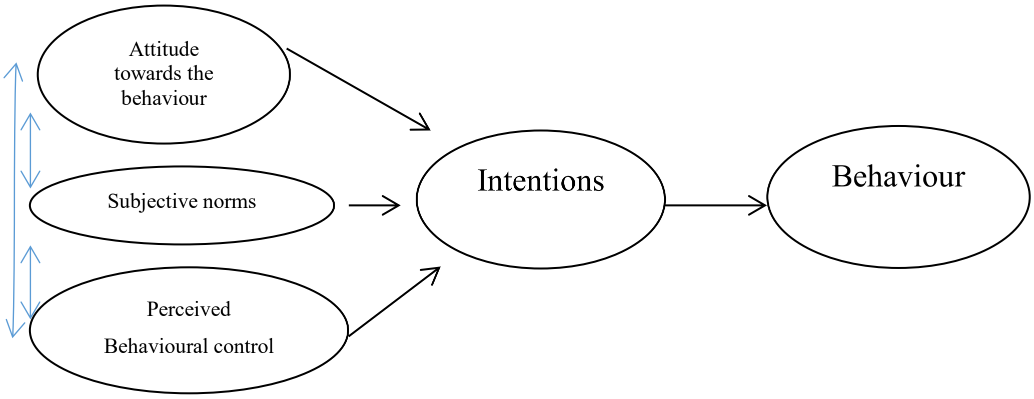
Subjective norms comprise normative beliefs (what a person thinks others would want or expect him/her to do) and motivation to comply (how important it is to a person to do what she/he thinks others expect) (Ajzen, 1991; Ajzen & Fishbein, 1977). Thus, these norms influence people's decision to engage or not engage in a behaviour in such a way that when people believe that others expect them to behave in a certain way, they would be likely to perceive social pressure to engage in that behaviour. In contrast, people are likely to perceive social pressure not to engage in a behaviour if the behaviour is considered to be taboo or is not be approved by the majority of others.

Perceived behavioural control (PBC) refers to the extent to which individuals perceive the behaviour to be within their control (Ajzen, 1991). It suggests that the behaviour is easy or hard to accomplish. TPB theorises that when people have time to plan how they are going to behave, the best predictor of that behaviour is one's intention, and this intention can actually be predicted by incorporating attitudes combined with perceived behavioural control (PBC) and subjective norms (SN) (Ajzen, 1991) (see Figure 2.2).

Based on TPB (Ajzen, 1991), if people believe an environmental behaviour will give positive consequences to them, believe it would be easy and believe that others will approve, then their intention to engage in this behaviour will be strong. The intention will strongly predict that people would probably behave in this way. In contrast, if the intentions are weak, TPB will predict that people would not perform the behaviour.

Previous studies confirmed the correlation of behavioural intention to subjective norms and attitude (see Sheeran, 2002). However, other studies also pointed about a gap between behavioural intention and actual behaviour (see Fife-Schaw, Sheeran, & Norman, 2007).

Figure.2.2. Theory of planned behaviour.



Source: Ajzen (1991, p. 182).

2.4 **Measuring environmental behaviour**

2.4.1 **Definition of Environmental Behaviour (EB)**

The use of the term ‘environmentally friendly behaviour” has been justified in Chapter 1 (Section 1.6). The present section shows how various authors have used different terms to indicate people’s behaviour related to the environment and what variables they have used to measure the same (See Table 2.2)

Some scholars prefer to use the term “ecological behaviour” (eg. Casey & Scott, 2006; Kaiser, 1998), whereas, many others used the term “environmental behaviour” (eg. Barr & Gilg, 2007; Olli, Grendstad, & Wollebaek, 2001). Another term that is also widely used by studies in the area of EB is the term ‘pro-environmental behaviour’ or PEB (eg. Bissing-Olson, Iyer, Fielding, & Zacher, 2013; Kollmuss & Agyeman, 2002). However, the above terms are not the only ones used in the discussion of EB. Other terms include “environmentally responsible behaviour” (Axelrod & Lehman, 1993; Chao & Lam, 2011; Ngo et al., 2009), “environmentally sensitive behaviour” (Diamantopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003), “behaviour in regard to environmental problems” (Sudarmadi et al., 2001), “conservation behaviour” (Fielding, Russell, Spinks, & Mankad, 2012; Schultz et al., 2005), “behaviour based environmental attitude” (Kaiser, Oerke, & Bogner, 2007), “green behaviour” (National Geographic & Globescan, 2014), “environment saving behaviour” (Barr, Gilg, & Ford, 2005), and “specific environmentally related behaviour” (Bamberg, 2003) etc.

Conversely, similar terms often use different definitions and different variables in quantifying the same term (see Table 2.2). Furthermore, some terms of EB are sometimes used interchangeably in one research. For example, Olli et al. (2001) and Nooney, Woodrum, Hoban, and Clifford (2003) use the term "environmental behaviour", but none specifically defined what they meant by EB. However, they used the term interchangeably with "responsible consumerism" or "resource conservation" (Olli et al., 2001, p. 192), or "environmentally protective behaviours" (Nooney et al., 2003, p. 769). Other examples are Geiger, Otto, and Schrader (2018) and Casey and Scott (2006). Geiger et al. (2018, p. 2) use the term "ecological behaviour" interchangeably with "green behaviour". Similarly, Casey and Scott (2006, pp. 57–67) used the term "ecological behaviour" interchangeably with the term "environmental behaviour".

Different terminology such as those described in Table 2.2 can lead to confusion. However, for the sake of consistency and simplicity, the term "environmental behaviour" has been used in the present study and is defined as people's behaviour related to consuming essential items for living and disposal of waste.

Based on their effects, the environmental behaviour (EB) used by previous studies can possibly be classified into two groups, namely (i) behaviour that includes both positive and negative effects on the environment, such as ecological behaviour and environmental behaviour; and (ii) behaviour that includes only the positive effects on the environment, such as environmentally protective behaviour, pro environmental behaviour and environmentally friendly behaviour (see Table 2.2).

Table 2.2. Definition of environmental behaviour.

Terms	Studies (year published)	Definition	Variables
ecological behaviour'	Kaiser (1998, p. 395)	actions which contribute towards environmental preservation and/or conservation	40 items in seven subscales: prosocial behaviour, ecological garbage removal, water and power conservation, ecologically aware consumer behaviour, garbage inhibition, volunteering in nature protection activities, and ecological automobile use
ecological behaviour/green behaviour	Geiger et al. (2018, p. 2)	behaviours that protect/avoid harm to the environment and span all areas of life such as nutrition, mobility and transportation, energy and water consumption, waste avoidance, and consumerism	50 variables in five subscales energy conservation, mobility, waste avoidance and recycling, consumerism, and vicarious, social behaviours towards conservation
ecological behaviour/ environmental behaviour	Casey and Scott (2006, p. 60)	behaviour over a range of recycling behaviours, consuming behaviours, and conserving behaviours	17 variables
responsible consumerism" or "resource conservation	Olli et al. (2001),	Not mentioned	16 behavioural items ranging from five subscales, i.e. responsible consumerism, resource conservation, use of nature, antitoxic and waste handling.
environmental behaviour	Nooney et al. (2003); Scott and Willits (1994)	actions "in ways that are environmentally responsible"	ten behavioural questions grouped into two subscales, consumer behaviour and political behaviour.
environmentally protective behaviour	Nooney, Woodrum, Hoban, & Clifford, 2003;	did not explicitly define	seven questions investigating respondents' political and personal environmental behaviour.
environmental behaviour	Barr and Gilg (2007),	day-to-day behaviour which reduces the use of resources by everyday practices, such as turning down thermostats and recycling packaging	ten daily actions that are grouped into energy-saving, water conservation, waste management and green consumerism.
environmental behaviour	Scott and Willits (1994, pp. 240–241)	actions "in ways that are environmentally responsible	ten questions grouped two subscales, consumer behaviour and political behaviour, suggested by Maloney, Ward, and Braucht (1975).
pro-environmental behaviour	Kollmuss and Agyeman (2002, p. 240)	behaviour that consciously seeks to [minimise] the negative impact of one's actions on the natural and built world	Minimise resource and energy consumption, use of non-toxic substances, reduce waste production.
pro-environmental behaviour	Gatersleben, Murtagh, and Abrahamse (2012)	did not explicitly define	two variables, i.e. how often are respondents buying "fair trade food products and organic food products
pro-environmental behaviour	Milfont, Duckitt, and Cameron (2006)	did not explicitly define	eight items (looked for ways to reuse things, recycled newspaper, recycled cans or bottles, encouraged friends of family to recycle, purchased products in reusable or recyclable containers, picked up litter that was not your own, composted food scraps, conserved gasoline by walking or bicycling)
pro-environmental behaviour	Walton and Austin (2011) i	behaviour that attempts to be in accord with the notion of sustainability	six questions in the area of energy conservation, recycling and green purchasing
pro-environmental behaviour	Steg and Vlek (2009, p. 309)	Behaviour that harms the environment as little as possible or even benefits the environment. (This definition follows Stern (2000, p. 408) definition of impact-oriented environmental behaviour).	-

Table 2.2 (continued).

Terms	Studies (year published)	Definition	Variables
pro-environmental behaviour	Jagers et al. (2013	activities with either an environmentally significant impact or conducted with an environmentally beneficial intent	Adopting a set of environmental behaviour introduced by Stern (2000, p. 409) which was called "private-sphere environmentalism" by adopting 12 voluntary private-sphere activities ranging from buying local meat, choosing not to use a car for specific trips, recycling, etc
Environmentally friendly behaviour	Cheah and Phau (2011); Dolnicar and Grün (2009); Han et al. (2010); Laroche et al. (2001); Meijers and Rutjens (2014); Thøgersen and Ölander (2003); Venhoeven et al. (2016)	did not explicitly define	Adopting a set of environmental behaviour from various topics, such as the severity of environmental problems, the importance of being environmentally friendly, the level of responsibility of corporations and the inconvenience of being environmentally friendly
Environmentally friendly behaviour	Cheah and Phau (2011); Dolnicar and Grün (2009); Han et al. (2010); Laroche et al. (2001); Meijers and Rutjens (2014); Thøgersen and Ölander (2003); Venhoeven et al. (2016)	did not explicitly define but use the term interchangeably with the term pro-environmental behaviour".	20 items on EB, including recycling newspaper and picking up litter
Environmentally friendly behaviour	Cheah and Phau (2011); Dolnicar and Grün (2009); Han et al. (2010); Laroche et al. (2001); Meijers and Rutjens (2014); Thøgersen and Ölander (2003); Venhoeven et al. (2016)	did not explicitly define, but use the term interchangeably with eco-friendly and green behaviour	Three items (waste separation, frequent in buying products that are wrapped in recyclable material and in buying disposable products)
Environmentally friendly behaviour	Cheah and Phau (2011); Dolnicar and Grün (2009); Han et al. (2010); Laroche et al. (2001); Meijers and Rutjens (2014); Thøgersen and Ölander (2003); Venhoeven et al. (2016),	did not explicitly define, but use the term interchangeably with environmentally compatible behaviour and green behaviour,	Five items (using separate box for recycling, checking that the products are wrapped in recyclable materials before buying wrapped products, refuse to buy from polluted company, frequent in buying plastics knives, forks or spoons, frequent in buying Styrofoam cups).
Environmentally friendly behaviour	Thøgersen and Ölander (2003);	environmentally friendly consumption	17 items in five area (organic food, green non-food, transport, conservation and recycling)
Environmentally friendly behaviour	Cheah and Phau (2011); Dolnicar and Grün (2009); Han et al. (2010); Laroche et al. (2001); Meijers and Rutjens (2014); Thøgersen and Ölander (2003); Venhoeven et al. (2016),	did not explicitly define	Asking respondents whether they thought they have bought one or more environmentally friendly products (yes /no), without defining the environmentally friendly label.
Environmental behaviour	Present study (Marpaleni, 2019)	People's behaviour with regard to six dimensions of daily living, namely food, water, energy, transport, housing and waste disposal.	30 items in the area of food, water, energy, transport, housing and waste disposal

Source: Compiled by the author based on the studies cited in the table.

Furthermore, in regard to their orientation to the environment, previous EB research can be classified on the basis of two perspectives, namely (i) the intent-oriented, which defines EB as the "behaviour that is undertaken with the intention to change (normally, to benefit) the environment" (Stern, 2000, p. 408); and (ii) the impact-oriented where EB can be defined as "the extent to which it [positively] changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere itself" (Stern, 2000, p. 408).

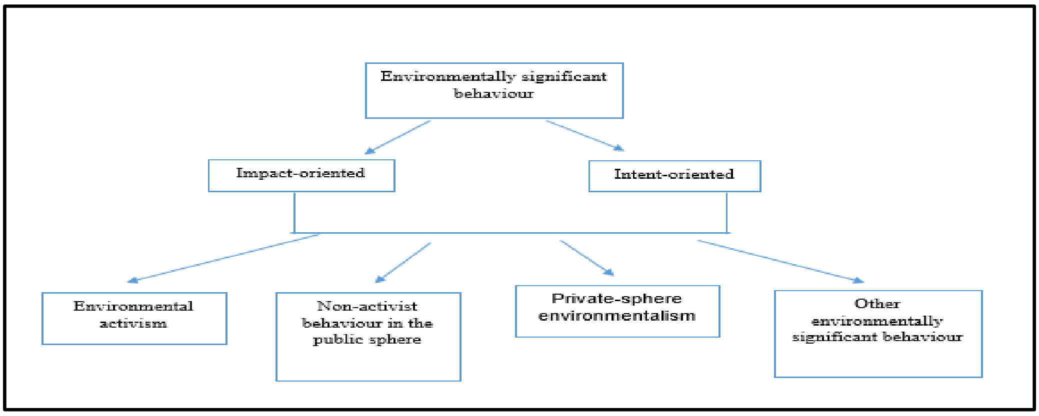
The two aforementioned perspectives differ in terms of the angle of their EB investigation. According to Stern (2000) an intent-oriented perspective focuses on the actor's motivation in undertaking EB. From this perspective, behaviour is framed as friendly behaviour if the actor who does the behaviour believes and values that this behaviour will give a positive impact to the environment. This perspective will not take into account whether or not the behaviour actually reduces negative impacts on the environment. On the other hand, impact-oriented perspective concerns the actual impacts of the behaviour. Based on this perspective, behaviour is framed as environmentally friendly if this behaviour could significantly drive environmental conservation. Some examples of these actions are recycling, electricity/water saving behaviour etc.

Stern (2000) further argues that although both definitions are equally important, but they work for different purposes. Both of them can – and do – overlap (i.e. one's intended actions may be effective) (Stern, 2000; Whitmarsh, 2009). First, an intent-oriented definition is useful for adoption for research targeting on changing the behaviour of the people. This definition also has the potential to investigate people's beliefs, motivations, etc., as well as to comprehend and change unfriendly behaviour. Meanwhile, an impact-oriented definition is a useful tool for research which emphasises identifying and understanding what and how a positive environmental behaviour, such as EB, can be achieved.

In addition, Stern (2000) states that previous EB studies also have various scope which can be grouped into four areas (see Figure 2.3). The first type is environmental activism which consists of efforts to encourage, manage, or negotiate in environmental reform with an aspiration to make improvements in society. Such efforts include conducting protests or sympathetic feelings towards the degraded environment, promoting an environmental campaign, or being actively involved or signed up with political environmental organisations such as Friends of the Earth, Greenpeace, Sea Shepherd, etc. (Bencze & Alsop, 2014; Stern, 2000).

The second type is environmentally non-activist political behaviour in a public sphere or public environmentally non-activism action (Stern, 2000). This EB consists of a form of everyday environmental engagement where individuals are actively refraining from explicit environmental protests or being part of collective environmental action. Such environmental engagement, for example, includes attending environmental meetings or contributing in monetary terms to the protection of the environment, voting, joining a community group (Bencze & Alsop, 2014; Hodson, 2014; Stern, 2000).

Figure 2.3. Types of environmentally significant behaviour according to Stern (2000).



Source: Drawn by the author based on Stern (2000).

The third type is private-sphere environmentalism or individual environmental action (Stern, 2000). This action includes choosing to drive instead of riding a bike, utilising reusable shopping bags, buying green products, or recycling (Bencze & Alsop, 2014; Stern, 2000).

Finally, the fourth type is an environmentally significant behaviour (Stern, 2000) which includes ecosystem actions (cleaning up a stream, installing nesting boxes), and particular behaviour within the workplace (reducing both waste production and resource consumption), or organisational action, such as actions to influence culture in an organisation e.g. promoting composting at work (Bencze & Alsop, 2014; Stern, 2000).

2.4.2 **The scope of measuring EB**

Previous empirical studies related to EB cover the behaviour in different scopes.

First, the examined behaviour is often conceptualised into single or unidimensional environmental behaviour. Studies that focus on single dimensional EB usually examined the behaviour based on the behaviour about a single item, such as organic food consumption (see Arvola et al., 2008) recycling (see Aprilia, Tezuka, & Spaargaren, 2012; Ewing, 2001; Hage, Söderholm, & Berglund, 2009; Tonglet, Phillips, & Read, 2004), water conservation (see Clark & Finley, 2007; Fielding et al., 2012), energy saving or transport-friendly behaviour (see Abrahamse & Steg, 2011; Gatersleben, Steg, & Vlek, 2002). Other studies focuses on a union of multi-dimensional constructs of behaviour and develop composite indicators that capture the different behaviours in one index (see Kaiser & Wilson, 2004).

According to OECD (2008a), composite indicators are recognized as valuable instrument to help identify trends and draw attention to specific issues. These indicators can help summarize complex realities by reducing the visible size of a set of indicators without dropping the underlying information base. Furthermore, its existence could enable users to compare complex dimensions effectively. Thus, since environmental behaviour is a multidimensional construct, unidimensional measures of EB could help broaden identify the examined behaviour among different categories of issues that affect the environment or population groups. However, subsequent research have shown that the dimensions and the specific components of the examined behaviour in each dimension were highly differentiated (see Kaiser & Wilson, 2004; National Geographic & Globescan, 2014; OECD, 2014)

Second, related to the way of behaviour reporting, most studies are based on self-reported behaviour. Based on this method, empirical data were gathered by asking participants to express their frequent action on a list of environmental behaviours. Some other studies are based on participant observation (Cialdini, 2003), while some other studies use a combination of self-report and observation, such as meter readings (Abrahamse & Steg, 2011). Due to their flexibility, relative ease of use and low cost, self-reports have been the most common data collection methods for the majority of researchers. Furthermore, self-reports make it possible to investigate unobservable behaviours (see Kormos & Gifford, 2014; Tarrant & Cordell, 1997). A meta-analysis of 15 studies done by Kormos and Gifford (2014) shows that self-reported studies in the area of EB are cost-efficient, convenient and demonstrate a high degree of validity in some cases.

Third, although dynamic measures to monitor EB over time are essential to help identify those trapped in environmentally not-friendly behaviour for longer periods as well as to monitor and evaluate the effectiveness of programmes and policies targeting environmentally not-friendly people, most studies are only done as cross-sectional research (see all research in Table 2.2). Such data can only be used to describe the environmental behaviour at a specific of time without no further insight to their variations over longitudinal periods.

Currently, very few studies measure and monitor EB across regions and over time. The next section describes some well-known international studies about the outcomes of people's environmental behaviour (EB) and the indicators of EB used in these studies. These studies are conducted by international agencies or national statistics offices, as the case may be, and are published periodically.

2.4.3 **Longitudinal studies across regions at an international level**

2.4.3.1 ***Ecological footprint***

The ecological footprint estimates the land area needed to support a population's existing levels of resource consumption and waste disposal (GFN, 2018; Wackernagel & Rees, 1998, p. 5). It measures the amount of pressure exerted by a population on the environment (GFN, 2018) and it estimates the demand people put on nature compared to how much nature can supply. While the demand is quantified in terms of ecological footprints, the supply is measured by ecological capacity (GFN, 2018; Goudie, 2019) or bio-capacity (Gray, 2015). Supply includes farmland, grazing areas, forest ground, fishing areas, and built-up ground. If these zones are sustained, they can absorb much of the pollution produced by humans, especially the carbon emissions (GFN, 2018). The ecological footprint is usually measured in global hectares or gha for an entire population or per head of the population, such as gha per capita (GFN, 2018).

Footprint analysis is beneficial for examining the impact of country's population on their local ecosystem, and whether a country's ecological consumption is greater or less than its existing bio-capacity. According to GFN (2018), the total ecological footprint of the 2014 global population was 20.6 billion gha. This implies that it requires 20.6 billion gha of productive land and water to fulfil the demand of the human population (including human consumption and waste disposal) in 2014. Dividing this number by the number of people on earth in 2014 (roughly 7.27 billion) this equalled the requirement of 2.84 gha per person to sustain the amount of consumption and waste creation by the average person in the world in 2014 (GFN, 2018). However, in the same year, the ecological capacity of the earth consisted of roughly 12.2 billion gha of productive land and sea (GFN, 2018). This measure of ecological capacity indicates the amount of regeneration of resources and the waste absorption that the earth could provide in 2014. Dividing this by the total humans on earth implies that the ecological capacity of earth in 2014 was approximately 1.68 gha per person (GFN, 2018).

Those two measures, i.e. the ecological footprint and the ecological capacity, taken together, provide information for an ecological balance sheet of the world. Firstly, the above measures indicate that the global ecological footprint is larger than the global bio-capacity. This implies that in 2014 the human population of the world lived in an era of ecological deficit[15], where the ecological footprint of the global population exceeded the earth's bio-capacity. The ecological deficit must lead to a depletion of the planet's life-supporting biological capital and/or an accumulation of waste products. The difference between the earth's ecological footprint and its ecological capacity is known as the ecological surplus or ecological deficit, depending on whether ecological capacity is greater or smaller than ecological footprint respectively. In the present case the earth is faced with an ecological deficit or overshoot[16]. Thus, as of 2014, the ecological overshoot of the earth was 69% which means that it would take the earth the equivalent of one year and eight months to regenerate the resources used

[15] According to GFN (2018) an ecological deficit occurs when the ecological "footprint of a population exceeds the bio-capacity of the area available to that population". A national ecological deficit means that "the nation is importing bio-capacity through trade, liquidating national ecological assets or emitting carbon dioxide waste into the atmosphere". An ecological reserve exists when "the bio-capacity of a region exceeds its population's ecological footprint" (GFN, 2018).

[16] Overshoot is the relative amount by which humanity's total ecological footprint is larger than the available bio-capacity (GFN, 2018).

and assimilate the wastes produced in that year. Secondly, the above measures also indicates that in 2014 the human population used the equivalent of 1.7 Earths to provide the resources humans used and to absorb the waste produced (GFN, 2018).

Almost all countries of the world experienced an ecological deficit in 2014 when almost 90% of the global population resided in countries where humans were using more resources than the environment could recover (GFN 2018). However, according to GFN (2018), it was not the first time that an ecological deficit had occurred. Humanity has been facing a world ecological deficit era since the 1970s; it first entered overshoot around 1980, and since then has continued to increase the amount of overshoot. The cumulative overshoot is known as ecological debt and represents issues such as deforestation, fish population decrease, and the accumulation of carbon dioxide in the atmosphere.

This catastrophe has also been happening in Indonesia, as GFN (2018) indicates that Indonesians are depleting the earth's life-supporting natural capacity by demanding more than the earth can annually provide. According to global environmental statistics, in 2014 Indonesia ranked 7th out of 188 countries, on the list of countries with the greatest ecological footprint on earth, with China in first position and Monserrat[17] the last. However, on a per capita basis, the country with the largest ecological footprint in 2014 was Qatar and the country with the smallest ecological footprint in 2014 was Timor Leste (GFN, 2018). In 2014 Indonesia possessed productive areas on land and sea of more than 300 million gha, which is equal to 1.3 global hectares (gha) per person (GFN, 2018), while in the same year, the total ecological footprint of Indonesia was 409 million gha or 1.6 gha per person, producing an ecological deficit of 0.3 gha and an ecological overshoot of 36%. This overshoot indicates that it took earth the equivalent of one year and four months to regenerate the resources used and assimilate the wastes produced by Indonesia in 12 months. Furthermore, the measure also implies that the ecological footprint of Indonesia was 1.23 times more than its biological capacity. As such, if everybody lives like today's Indonesians, it would take more than 20% additional Planet Earths to produce resources, absorb the waste, and otherwise maintain life-support. The components used in the calculation of ecological footprint

[17] Monserrat is one of British overseas territories. This country is located in the Caribbean, North Atlantic Ocean (Pattullo, 2019).

include the frequency and type of food consumed, house construction materials, the amount and type of energy used in the household for cooking, heating/cooling, and in transport, the use of water for household and/or gardens and the waste produced. As such, the ecological footprint is an outcome measure of the behaviour of people.

2.4.3.2 ***Greendex and EPIC***

National Geographic and GlobeScan (2008) developed an index called Greendex in 2008. This study aimed to observe the pattern of environmentally sustainable consumption across the globe, based on internet-based interviews. This survey defined environmentally sustainable consumption as "consumption that demanded less of ecosystem services that the earth provides and is less likely to impair the ability of future generations to meet their own needs as a result" (National Geographic & GlobeScan, 2008, p. 3). A sample of 14,000 people was used which was equally distributed across 14 countries considering education, age, and gender by use of quotas. These 14 countries represent both developed and developing countries (see Table 2.3).

Greendex survey grouped the questions into four major themes, i.e. consumption for housing, for transportation, for food and non-food and for goods and disposal (National Geographic & GlobeScan, 2008, 2010, 2012, 2014). Questions in the housing theme include the use of heating and air conditioning, the use of energy-efficient household appliances, the habit of turning on air conditioners at low temperatures, changing electricity consumption compared with a year previously and the reason for changes in electricity consumption. Questions in the transportation area included: the reasons for choosing a place to live, the average number of motorised vehicle ownership, the type of car being driven by itself, the frequency of driving a motorised vehicle, the frequency of use of public transportation, changes in fuel consumption compared to a year ago and the reason for the change in fuel. For the theme of food consumption, the questions asked were the frequency of eating imported food, the frequency of eating food (meat, chicken, fish/seafood, fruit and vegetables, and bottled water), and the frequency of eating packaged foods. Questions in the area of non-food consumption covered the habit of repairing durable goods rather than replacing them with new items, habits around buying used durable goods, using items that can be washed again, buying goods that are environmentally friendly, and the frequency of carrying your own shopping bags (National Geographic & GlobeScan, 2008, 2010, 2012, 2014).

Table 2.3. The coverage of Greendex in 2008, 2010, 2012 and 2014.

Component	Greendex 2008	Greendex 2010	Greendex 2012	Greendex 2014
General				
• Target location	14 countries[18]	17 countries[19]	17 countries[20]	18 countries[21]
• Target samples	14,000	17,000	17,000	18,000
• Sample acquired				
• Methods of sampling selection	A quantitative Internet methodology by setting a quota cap on education, age, and gender	The same as 2008's	The same as 2008's	The same as 2008's
• Level of analysis	Country	Country	Country	Country
Questionnaire				
• Total questions on EB	65	65	65	65
EB's scope				
• Number of dimensions	4	4	4	4
• Questions per dimensions				
1. Housing	24	24	24	24
2. Transportation	17	17	17	17
3. Food	8	8	8	8
4. Goods and disposal	16	16	16	16

Source: Prepared by the author based on National Geographic and GlobeScan (2008, 2010, 2012, 2014).

The purpose of this survey was to develop a composite index called Greendex by applying scoring methods. When calculating this composite index, all four major themes being investigated were weighted, and based on an argument that the scale of impact of each theme put on the environment, the housing and behaviour themes were given greater weights[22] (National Geographic & GlobeScan, 2008, p. 28). The composite score was valued from zero to 100. A higher Greendex represents more positive environmental behaviour, while a lower Greendex represents more negative environmental behaviour (National Geographic & GlobeScan, 2008, 2010, 2012, 2014).

[18] These countries are Australia, Brazil, Canada, China, France, Germany, Great Britain, Hungary, India, Japan, Mexico, Russia, Spain, and USA (National Geographic & GlobeScan, 2008).

[19] These countries are the 14 countries being surveyed in 2008 plus Argentina, South Korea and Sweden (National Geographic & GlobeScan, 2010).

[20] These countries are the same as 2010's (National Geographic & GlobeScan, 2012).

[21] These countries are the 17 countries being surveyed in 2012 plus South Africa (National Geographic & Globescan, 2014).

[22] Out of 100%, greendex gave housing and transport sectors 30% weight each whereas food, and goods plus disposal were weighted 20% each (National Geographic & GlobeScan, 2008, p. 28).

From 2008 to 2014 Greendex was continually monitored every two years (National Geographic & GlobeScan, 2008, 2010, 2012, 2014). In the most recent survey (2014), Greendex reported that countries who achieved the highest rating are in the developing economies of India, China, and South Korea, while industrialised countries rank at the bottom. American consumer's scores ranked at the very bottom, with Canadian, French and Japan consumers just above this. The good news is that compared to their base line level in 2008, environmentally sustainable consumer behaviour in all countries being studied has improved, except for Brazil which achieved a lower score in 2014 than 2008 because it had lower scores on all the sub-indexes (National Geographic & Globescan, 2014).

Other study conducted by the Organisation for Economic Co-operation and Development (OECD) in 2008 initiated a survey on Environmental Policy and Individual Behaviour Change (EPIC) involving approximately 1,000 households in each of the ten[23] OECD countries (OECD, 2008b, 2011). Concerning the impact of household daily behaviour on the environment, the OECD developed EPIC to generate empirically founded guidance for policy makers on what really works to foster greener behaviour. During 2008–2014, this survey was conducted once every three years, i.e. 2008 and 2011 (OECD, 2014). In 2011, this survey covered larger samples by including approximately 1,000 additional households samples from Israel (OECD, 2013), whereas in 2014, this survey provided public policy analysis based on the data collected in 2011 (OECD, 2014).

EPIC 2008 and 2011 collected data by an internet panel-based online survey and the respondents were selected by considering age, gender, region and socioeconomic status. During 2008 and 2011, EPIC used similar questionnaires covering five main aspects of household behaviour, i.e. water use, energy use, transportation use, food consumption, and waste management (OECD, 2008b, 2011, 2013). However, before 2011, questions on labelling, on adoption of eco-innovations such as fuel alternatives and on barriers to policy implementation (waste and transport policies) were not

[23] These countries were Australia, Canada, Chile, France, Israel, Japan, Korea, the Netherlands, Spain, Sweden, Switzerland.

available. The similarities and the differences of the EPIC's coverage during its surveys on 2008 and 2011 are provided in Table 2.4.

Table 2.4. The coverage of EPIC in 2008 and 2011.

Component	EPIC 2008	EPIC 2011
General		
• Target Location	10 countries (Australia, Canada, Chile, France, Israel, Japan, Korea, the Netherlands, Spain, Sweden, Switzerland)	11 countries (10 countries surveyed in EPIC 2008 plus Israel
• Target Samples	10,000 households	12,000 households
• Sample acquired		12,202 households
• Methods of Sampling Selection	• Internet panel-based online survey[24]. • Sample stratified by age, gender, region and socio economic status	• Internet panel-based online survey. • Sample stratified by age, gender, region and socio economic status
• Level of Analysis	Country	Country
Questionnaire		
• Page	34	30
• Total Questions	95	98
EB's scope		
• Number of Dimensions	5	5
• Questions per Dimensions		
1. Waste management	16	10
2. Transportation use	13	22
3. Energy use	13	15
4. Food consumption	9	11
5. Water used	12	8
• Sociodemographic and others	21	20
• Attitudinal characteristics	11	12

Source: Prepared by the author of this thesis based on OECD (2011, 2013).

The analysis was carried out by connecting the market factors, demographic aspects, and government policies related to EB to provide input on the development of government policies to encourage EB. However, unlike the Greendex survey, EPIC does not provide a single measurement which can summarises the performance of respondents in a single indicator of environmental behaviour and analysis of the survey results was provided by comparing variable with variable.

The two studies mentioned above provide information on the development of indices to measure environmental behaviour internationally or globally. However, except for the Ecological Footprint study Indonesia has not been a part of any of the studies

[24] OECD employed a survey provider (Lightspeed Research) to collect responses from its online consumers in different countries (OECD, 2011).

mentioned above. As such, the condition of Indonesia or South Sumatra cannot be interpreted by either measure, Greendex or EPIC.

Table 2.5. The coverage of EB's dimensions in Greendex and EPIC.

Dimensions	Greendex	EPIC
1. Housing	Size of residence relative to number of inhabitants, home heating and cooling, including fuel source, hot water and water-heating equipment, recent upgrades to residence that result in more efficient heating or cooling, consumption of renewable energy (both through the grid and generated on-site), energy-efficient major appliances, water usage	-
2. Transportation	Driving, ownerships of motorised vehicles, size of vehicles driven, owning an ultra-low emission vehicle, air travel, use of public transit, taking trains, riding a bicycle, walking, and location of residence relative to primary destination.	the number of motor vehicles owned, the reason for not owning a car, the age of the car, type of fuel, capacity of the car, driving distance, motivation to reduce motorised vehicle use, and attitude if the government raised 20% of fuel prices on the use of motorised vehicles, the type of transportation used according to the type of daily activities, and the motivation to use public transportation.
3. Food	Locally produced food, food grown by oneself, fruits and vegetables, beef, chicken, seafood, bottled water and organic food.	Location of shopping, frequency of food purchases (fruits and vegetables, meat, eggs, rice/wheat/cereal), motivation to eat organic food, and how households recognise organic food
4. Disposal/waste management	Recycling habit	Frequency of waste sorting, how much waste is generated for each week, the type of waste that can be recycled, the motivation to recycle, and whether it is collected for waste disposal facilities used
5. Energy use	-	Energy sources used by the household, the energy sources that must be paid by the household, motivation to use renewable energy, the type of electrical equipment that is owned, the behaviour to turn off electrical appliances when they are not being used, and the motivation to reduce energy use
6. Consumption of goods	Purchase and/or avoidance of specific products for environmental reasons, Avoidance of excessive packaging, Preference for reusable consumer goods over disposable products, Willingness to pay an environmental premium, Preference for used rather than new items, Preference to repair rather than to buy a replacement, Number of TVs and PCs per household member, Numbers of refrigerators, dishwashers, and laundry machines per household member, Second homes, recreational vehicles, lawnmowers, and other small engines.	-
7. Water	-	Whether households pay for water consumed, behaviour that does not allow water to flow without use, ownership of tools that can save water, and motivation to reduce water use.

Source: Prepared by the author based on OECD (2011, 2013) and National Geographic and GlobeScan (2008, 2010, 2012, 2014).

Table 2.5 provides a detailed comparison of variables being covered in the measurement of EB in Greendex and EPIC. In terms of variable being covered in the EB measurement, EPIC covers larger sets of variables, especially because Greendex does not cover environmental behaviour related to water consumption. Furthermore, although these two studies share several dimensions in common (transportation, food and disposal/waste management), the variables being covered by each of these dimensions are not exactly the same. As such the same dimension differs in their ability to estimate the impacts environmental behaviour in each case. In contrast, two unshared dimensions, i.e. housing and energy, to some extent, are sharing similar variables.

2.4.4 **Longitudinal studies across regions in Indonesia**

In Indonesia, official efforts to measure the level of environmental behaviour is of recent origin and have been done only a few times. In 2010 and 2011 BPS, the official statistics agency, initiated a study called SPPLH (*Studi Perilaku Peduli Lingkungan Hidup* – Study of Environment Caring Behaviour) (BPS, 2011a). This study aims to test the sampling design and the questionnaire for the SPPLH as a future survey for monitoring household concerns about the environment in Indonesia. The difference between the 2010 and the 2011 studies was in geographical coverage (BPS, 2011a), with the 2010 study being conducted in five major coastal cities and the 2011 study in six regencies/municipalities located in mountainous areas which have no direct border with the sea (BPS, 2011a). Further, while the 2010 sample covered only urban areas, the 2011 study covered both urban and rural areas (BPS, 2011a).

SPPLH has been conducted in every province of Indonesia since 2012 with the aim to monitor the daily environmental behaviour of Indonesian households by asking questions about people's daily activities in the area of housing, energy, waste management, water usage, transportation usage and community service (BPS, 2011a). In 2012, the scope of this survey was limited only to the capital city of each province and in 2013, this survey continued with larger samples and wider scope (BPS, 2013c), but thereafter BPS has not conducted this survey again.

In general, the 2012 and 2013 SPPLH had the same goal, i.e. to investigate the environmental behaviour of Indonesians (BPS, 2012b, 2013c). The fundamental difference between these two surveys are related to the scope of the description and variables being investigated. At SPPLH 2012, the survey only aimed to describe the environmental behaviour of Indonesians on a national scale. Hence, only 33 provincial capitals in Indonesia were selected as the location for the survey (BPS, 2012b). The total number of households covered by the surveys was 3,300, selected by two-stage sampling. The first stage was to choose 10 locations (called census blocks[25]) in the urban area of each provincial capital. The second stage consisted of choosing 10 households in each selected census block. Furthermore, the survey measured environmental behaviour (EB) in seven dimensions, namely housing, energy, garbage disposal, water consumption, transportation, food consumption and the environment attitude in the neighbourhood. People's behaviour on these seven dimensions were tested through 35 questions on a six-page questionnaire (BPS, 2012b).

In the 2013 SPPLH, the survey included a wider sample with 75,000 respondents who were interviewed by about 3,000 trained interviewers (BPS, 2013c). This number was equivalent to the number of Susenas[26] samples on quarter 2 of 2013. The method of sampling of the SPPLH 2013 was the same as the methodology used by Susenas[27] (BPS, 2013c).

Similar to SPPLH 2012, the 2013 SPPLH samples were spread throughout the 33 provinces. However, the 2013 survey had a wider coverage to include all districts/cities, so that its results can be compared at the provincial level. Furthermore, in terms of coverage, SPPLH in 2013 aimed to examine EB on six dimensions. The only EB dimension of SPPLH 2012 that was left in the 2013 SPPLH was that of food consumption (BPS, 2012b, 2013c). As such, the total number of questions asked of the 2013 SPPLH's respondents was 32 delivered on a 6-page questionnaire (BPS, 2013c). Table 2.6 shows that during the years, numbers of variables being investigated in SPPLH decreases, from 37 in 2011 to 35 in 2012 and to 32 in 2013. Except housing and attitude towards environment in the neighbourhood, the number of questions in other dimensions remained the same.

Unfortunately, in spite of the importance of SPPLH in providing knowledge of EB in Indonesia, these surveys lasted only two years and as already mentioned, have not been conducted again since 2014.

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[25] See Chapter 3.
[26] Susenas is the abbreviation for Survey Sosial Ekonomi Nasional, it is the National Socio Economic Survey of Indonesia.
[27] See Chapter 3.

With reference to the province selected in the present thesis, namely South Sumatra, BPS held its SPPLH three times, i.e. in 2011, 2012 and 2013. In 2011, the provincial capital Palembang was selected in the sample, with 60 households, which was equal to the size of the 2011 SPPLH in all selected cities (BPS, 2011a).

In 2012, the sample size in South Sumatra was 100 households, which was also equal to the sample size in each of the other 32 provinces of Indonesia and the entire sample in South Sumatra was located in Palembang. In 2013, the sample size was 2,390 households distributed across all districts/cities of South Sumatra. This survey involved 96 trained enumerators who were working in 239 selected census blocks all across South Sumatra. The similarities and the differences of the SPPLH's coverage during its surveys on 2010–2013 are provided in Table 2.6.

Table 2.6. The coverage of SPPLH in 2010–2013 (locations in South Sumatra are highlighted).

Component	SPPLH 2010	SPPLH 2011	SPPLH 2012	SPPLH 2013
General • Target Location	Medan, South Jakarta, Surabaya, Denpasar, Makasar	Pekanbaru, Palembang, Bandung, Semarang, Banjar and Samarinda	The Capital City of 33 provinces in Indonesia (including Palembang)	All regencies/Cities in Indonesia (including regencies/Cities in South Sumatra)
• Target Samples	N/A[28]	360 respondents	3.300 respondents	75,000 respondents
• Methods of Sampling Selection		Systematic random Sampling	2 phase sampling	Three stages stratified sampling
• Level of Analysis	Testing the Questionnaire	Testing the Questionnaire	National Level	Provincial Level
Questionnaire	N/A[28]			
• Page		6	6	6
• Total EB Questions		37	35	32
EB's scope				
• Number of Dimensions		6	7	6
• Questions per Dimensions				
1. Housing		11	6	6
2. Energy		6	7	7
3. Waste inhibition		3	4	10
4. Water Consumption		7	5	6
5. Transportation		4	9	4
6. Food Consumption		3[29]	2	-
7. Attitude to environment in the Neighbourhood		4	2	2

Source: Prepared by the author based on BPS (2011a, 2012b, 2013c).

Post-2013 SPPLH, BPS was still trying to collect data to monitor household behaviour related to the environment. In 2014, BPS attempted to insert questions associated with

[28] Information was not available.
[29] Including consumption for durable goods.

EB into the third quarter of Susenas. These questions were merged in the Susenas's social resilience module (SRM) questionnaire (BPS, 2015e).

Susenas (National Socio-economic Survey) was firstly conducted in Indonesia in 1963 (BPS, 2014a). Generally, Susenas collects data from two separate types of questionnaires – (i) the Core Questionnaire, and (ii) Module questionnaire. The core questionnaire contains the Susenas's significant questions and is applied whenever a Susenas is held, while the Module questionnaire contains questions on important socio-economic issues. Up to 2013, Susenas has had three different types of module questionnaires: the consumption module; the education and social culture module and the health and housing module; however, in 2014 a new module was introduced, i.e. the social resilience module or SRM has been added. This module includes several questions on household environmental behaviour on five dimensions – water use, energy use, transportation, waste handling and attitude to the environment in the neighbourhood (BPS, 2015e).

Before 2015, Susenas has only three modules, collected data four times a year, each of these modules was introduced interchangeably in each quarter. However, since 2015, the Susenas data collection was rescheduled to be held twice a year with a new arrangement for Susenas's module data collection. According to this new rule, the Susenas's first-semester data collection or March data collection only uses the consumption module to accompany the core questionnaire, whereas the Susenas's second-semester data collection or September data collection uses the consumption module plus one of the other three modules. This new rule also implies that the consumption module data would be recorded twice a year because it provides the primary source of poverty measurement which is monitored per semester (BPS, 2015e). As such, the Susenas data collection in September (2nd Semester) is scheduled to survey the other three data modules interchangeably once every three years. Hence, since the SRM data had been already recorded in 2014, this module would only be repeated three years later, i.e., in 2017 followed by 2020 and so on. As such, when the present thesis conducted its own data collection in September 2016, BPS had not yet updated its SRM data which covers household's EB data.

In general, questions related to EB in SRM are provided in the fourth to eighth sections of the questionnaire (BPS, 2015e). As mentioned above, each of these sections aims to collect information about water use, energy use, transportation, waste handling and attitude to the environment in the neighbourhood. One section refers to one dimension of EB. As such, compared to the number of dimensions and questions related to EB in 2012 and 2013 SPPLH, the variables collected in the Susenas's SRM are fewer because Susenas's SRM is not designed only to collect data on EB, but also other variables, such as politics and social security.

The design of questions in the 2014 Susenas and thereafter is different from one year to another, both in terms of coverage and the number of questions. In 2014, there were questions on only four aspects, which did not include separate questions on housing aspects. However, questions about housing aspects were located to the other aspects, such energy.

The results of SPPLH are disseminated at the national level (see BPS, 2011a; BPS, 2012b, 2013a). The reports also include information at provincial level, however, the information reported from BPS (2011a, 2012b, 2013a) only cover the performance of environmental behaviour based on variables, by presenting the proportion of people in each Likert option in each question in the questionnaire. The survey does not provide information concerning the aggregate score of environmental behaviour achievement in each dimension of housing, energy, water usage, transportation or waste handling. A single indicator, which could represent the achievement of all dimensions, is also not available.

In 2016, as the official statistics agency of Indonesia, BPS or Statistics Indonesia released 117 statistics at national level by monthly and quarterly press release (BPS, 2016a). In the same period, BPS – South Sumatra released 71 indicators at provincial level (BPS Provinsi Sumatera Selatan, 2016a). However, none of these publicly press-released indicators refers to environmental behaviour by the Indonesian or South Sumatran residents.

2.5 **Determinants of environmental behavior**

Numerous theoretical frameworks have been developed to explain the determinants of environmental behaviour. In this section, we classify the different determinants into three broad categories: consumption categories, psychological variables and socioeconomic factors.

2.5.1 **EB and consumption categories**

Empirical evidence of the EB based on consumption categories as it was explained by Greendex shows that, consumers in India, South Korea, Argentina, Mexico, Sweden and Australia have been behaving more friendly towards the environment, as the Greendex scores in these countries have substantially increased during that period (National Geographic & Globescan, 2014).

However, the drivers of the increased index are various. It is housing dimension that driven the higher Greendex in India. Whereas the main positive driver for the increase in Greendex in Argentina and Sweden are transportation dimension. In Australian and South Korean, the driver of the increased scores are food dimension. While in Mexico, it is driven by higher housing and food scores (National Geographic & Globescan, 2014).

Based on consumption categories, National Geographic and Globescan (2014) shows that in 2012-2014 the best environmentally friendly consumers in the housing dimensions are people from emerging economies such as India, Mexico, China, and Brazil. In contrast, consumers from developed countries (Britain, France, Japan, Canada, and the USA) performed the least environmentally friendly in the housing dimensions.

Furthermore, (National Geographic & Globescan, 2014) reported that most homes in Japan are still heated with fossil fuel the most. Whereas, the majority of consumers in Canada, USA, and Brazil own energy saving televisions. Furthermore, OECD (2013) reported that drivers of energy-saving behaviour include economic and attitudinal factors in ways that higher-income households perform energy-saving behaviours engage less frequently. However, the more the households engage in energy-saving behaviours, the higher their concerns for global environmental problems.

In the area of transportation, National Geographic and Globescan (2014) reported that consumers in many countries remains stable since 2012. While, Swedish people increased their transportation scores, Chinese tend to decrease theirs. That is so because, while Swedish is less likely to drive alone now than in 2012, Chinese is much more likely. In general, people in most countries still less likely to use of public transportation. Whereas, Americans continue using public transportation the least, Russians use public transport every day the most. However, OECD (2013) found that the association among car ownership and environmental awareness and concerns are not as strong as the relationship between environmental concerns and car use (given ownership). Nevertheless, the condition by country is varied.

In the area of food consumption, National Geographic and Globescan (2014) indicates that most of respondents consume beef once or more per week. More than 60% respondents in Argentina and Brazil consume beef the most likely for daily or several times a week, whereas the least beef consumers are still in India. Besides beef, chicken is highly consumed in most countries surveyed. Spaniards and Brazilians are more likely to eat chicken compare to the year 2012.

2.5.2 **EB and psychological variables**

According to Vaughan and Hogg (2014, p. 136), an attitude is "a relatively enduring organisation of beliefs, feelings, and behavioural tendencies towards socially significant objects, groups, events or symbols". As such, attitudes refer to the overall positive or negative evaluation of performing a behaviour. Furthermore, Ajzen (1991) stated that if people think positively about behaviour, then their intention to engage in this behaviour will be firm. On the other hand, if they think the behaviour is negative, intentions are weak, then it is predicted that people will not turn behaviour into pratice.

Numerous research studied the relationships between attitude and environmental behaviour. Clark and Finley (2007) found that attitude and environmental behaviour are positively related. According to their research, in Bulgaria people who had more positive attitudes to water conservation, curtailment and efficiency, behaviours had stronger intentions to engage in water conservation actions and install water efficient appliances. However, research by Paço and Lavrador (2017) report a weak relationship between environmental attitudes and environmental behaviour in regard to energy conservation issues (savings, consumption, interest, use) among university students in Portugal. A possible cause of such a weak relationship was the existence of a moderator variable called environmental knowledge. Paço and Lavrador (2017) found that regardless their level of environmental knowledge, the environmental behaviour of their respondents were not different, which in that case decreased the strength of the effect of attitude to environmental behaviour. Since all respondents studied by Paço and Lavrador (2017) came only from one educational institution, the extent to which those students gained proper access to environmental information in their universities was not explored.

Regarding subjective norms (SN), Ajzen (1991) refers to the term as the extent to which people think their significant others expect them to perform a behaviour. As such, the SN determined others' approval or disapproval of the behaviour; such as if the behaviour is considered to be taboo or whether their reputation will be affected. Hence, if people think that their SN will be approved, then their intention to engage in this behaviour will be strong (Ajzen, 1991). Previous research showed various results indicating the relationships between subjective norms and environmental behaviour. Studies by Connell (2010) found that societal norms had a negative relationship with purchase intention and actual purchase behaviour amongst 109 respondents in USA. In contrast, Eze and Ndubisi (2013) found that subjective norms and environmental behaviour are positively related in Malaysia, wherein positively influenced people in their purchase intention actually purchase green products. Although results of these two studies are in conflict with one another, their findings indicate that subjective norms exert a powerful influence on environmental behaviour.

In addition to attitude and SN, another variable which influences people's intention to adopt a behaviour is the perceived behavioural control (PBC). PBC is an individual perspective of their capability to deal with environmental behaviour. As such, PBC implies barriers or constraints that affect the extent to which individuals perceive the behaviour to be within their control. PBC suggests whether an individual perceives a behaviour is easy or hard to accomplish. As mentioned in Section 2.3, TPB suggested that if people thought the behaviour would be easy, then their intention to engage in this behaviour would be strong (Ajzen, 1991). This intention would strongly predict that people would probably do the behaviour but if the behaviour is likely to be hard, then intention will predict that people would not do it. Likewise, previous research indicated the importance of PBC in understanding variations within environmental behaviour. However the studies referred to here often reveal conflicting results. A study from Arvola et al. (2008) reported that that PBC had a negative relationship with purchase intention and actual purchase behaviour of organic food in Italy, Finland and UK. In contrast, Wang, Liu, and Qi (2014) found a significant relationship between environmental behaviour and PBC in China, in which PBC gave positive impact on intention and actual purchase of green products.

To summarize, it can be said although there is some evidence that attitude, subjective norms and perceived behavioural control have a say in understanding environmental behaviour, yet further empirical investigation is warranted due to their conflicting results and the limited research in Indonesia.

2.5.3 **EB and socioeconomics variables**

The literature on environmental behaviour recommends that there is substantial opportunity for improvement in statistical modelling aimed at predicting EB. Instinctively, the best predictor of EB should be the environmental concern or attitude, however, many researchers acknowledge that the gap between attitude and behaviour is still massive. Outside environmental concern – attitude, other predictors of EB that were mostly adopted were socioeconomic variables (i.e., gender, education, age, income, etc.).

2.5.3.1 ***Gender***

Studies on the impact of gender on environmental behaviour generally suggest that women are more environmentally oriented than men. A study by Larson, Whiting, and Green (2011) in Atlanta (USA) found that gender appeared to be a good predictor of biocentric values, with females showing more support for that particular orientation. Studies by Ngo et al. (2009, p. 158) also suggested that men across Canada pay significantly less attention to indoor GHG reduction activities than women. This should serve as a wake-up call to male citizens who may continue to believe that household maintenance tasks are the exclusive domain of women. When it comes to automobile GHG emissions, the results indicate that men produce more automobile GHG emissions. They are driving significantly more kilometres than women, probably in larger vehicles, and thus produce more annual automobile GHG emissions. Olli et al. (2001) showed that all over Norway, gender is the strongest predictor of environmental behaviour. On average, women tend to regularly undertake one more acts of environmental behaviour than men do. McEachern, Seaman, Padel, and Foster (2005) found that comparing to male respondents, young working women and middle-aged women have participated in a greater depth of topic while discussing organic food during 12 focus group discussion – FGDs in Aberystwyth, Reading and Lancaster of UK. Such findings reflect that women are better informed on the issues related to organic food, perhaps because women are among the core buyers of organic food. Another study in Colorado (USA) by J. Vaske (2001) indicated that females indeed tend to be more environmentally concerned than male. Females, on the other hand, were more biocentric and more likely to hold a pro-preservation norm.

However, studies that reported no relationship between gender and environmental behaviour also exist. A study by Arcury, Scollay, and Johnson (1987) in Kentucky, USA, reported no significant relationship in attitude toward acid rain issues based on sex. Similarly, McFarlane and Hunt (2006) found gender differences were not found in specific environmental attitudes and activism concerning forest management in Ontario, Canada.

2.5.3.2 ***Education***

Education's ability to change attitudes and increase understanding of complex issues provides a clear rationale for its role in promoting environmental behaviour. It has been suggested that education creates or enhances environmental behaviour through initiating attitudinal change. Consequently, it is widely believed that the higher the level of formal education the more likely people will be to engage with environmental behaviour. However, studies examining the relationship between education and environmental behaviour suggest that the relationships were not unique. Larson et al. (2011) found that education was not significantly correlated with environmental behaviour in Atlanta (USA); however another study by Olli et al. (2001) showed a positive correlation between education and EB all over Norway. They found that seven years of education bring about one additional environmental act. Meanwhile, Poortinga, Steg, Vlek, and Wiersma (2003) found a negative correlation between education and EB all over the Netherlands, as they found groups with a low level of education generally engage in more energy-saving behaviour by adopting fewer energy using appliances.

2.5.3.3 ***Age***

Theoretically, it is widely believed that age is a good predictor of environmental behaviour. According to Burton (2014), age reflects the social cohort[30] within which a person was raised; and to some extent, age often reflects experience, which could influence decisions in conducting or not conducting a behaviour. However, studies examining the relationship between age and environmental behaviour suggest that the relationships between the two differ. Poortinga et al. (2003) found that older individuals all over the Netherlands evaluated transport measures as relatively more acceptable (and home measures as relatively less acceptable) than did younger individuals. This result is not surprising since in general older respondents are less independently mobile. On the contrary, studies by Ngo et al. (2009, p. 158) found that respondents in the younger age categories engaged in fewer indoor GHG behaviours all across Canada.

2.5.3.4 ***Income***

Various studies have also linked environmental behaviour to income. However, the results are not uniform. Ifegbesan and Rampedi (2018) found that regardless of their level of income, the nature of environmental behaviour among Nigerians was no different. From their study in Atlanta (USA), Larson et al. (2011) found that income had a negative association with anthropocentric value, however, incomes were not significantly correlated in relation to biocentric value. Ngo et al. (2009, p. 158) found that higher income households are more prone to produce higher categories of indoor GHG behaviours all across Canada. A study by Olli et al. (2001) in Norway identified that those in the lowest income bracket perform more than one act more than those in the highest bracket while Poortinga et al. (2003) found that high income respondents all over the Netherlands evaluated public transport measures as less acceptable (and home measures as more acceptable) than low and average-income respondents did. This is because respondents with a higher income travel more by car than do respondents with a low income.

To sum up, previous studies outlined above showed that for many instances environmental behaviour may vary across demographic factors such as gender,

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[30] Hobcraft, Menken, and Preston (1985, p. 12) defines cohort as “the aggregate of individuals (within some population definition) who experienced the same event within the same time interval” and “in almost all cohort research to date, the defining event has been birth”.

educational status, household size and composition, location of residence, etc. Such inconsistencies are a clear illustration of the need to further investigate the linkages between the demographic characteristics and all aspects of the environmental behaviour construct.

2.6 **Summary**

This chapter provides a review of relevant literature in the area population and environment that indicates plenty reasons for tackling the issue of environmentally not friendly behaviour. The current consensus is that the adoption of environmentally friendly behaviour in daily life is important.

However, various definitions of environmental behaviour exist. Different approaches to measuring the term also evolved. Furthermore, there is a gap in our understanding of how the adoption of environmentally friendly behaviour is different or similar between different consumption categories, socioeconomic characteristics or psychological behaviour. Previous studies in those areas provide mixed results. Nonetheless, the concept of environmentally friendly behaviour should be distinguished from the broader concept of environmental behaviour, as the latest includes both environmentally friendly and not friendly behaviour.

Furthermore, as individuals who have not yet adopted the environmentally friendly behaviour exist, efforts to monitor environmental behaviour over time would be beneficial. Such an effort could not only useful for monitoring the progress that we are measuring, it could also help identify causal factors of environmentally unfriendly behaviour and of the need for policies to help foster environmental behaviour in the daily life.

The next chapter will discuss the methodology and materials proposed by this thesis to measure the level of environmental behaviour in South Sumatra and to analyse the resulting indicators by considering the consumption categories as well as the psychological and socioeconomic characteristics of the respondents.

CHAPTER: 3 METHODS AND MATERIAL

3.1 Introduction

This chapter explains the approaches used for achieving the research objectives of the thesis for which both primary and secondary data have been used. The chapter outlines the research design, methods of data collection, population and sampling design, data quality assurance and background information of the research area, and the methods of analysing the data for answering each research question.

3.2 The research design

All research needs to be designed carefully so that it can go smoothly in the right direction. Kumar (2005, p. 8) defines research design as "a plan, structure, and strategy of investigations so conceived as to obtain answers to research questions and problems". As such, a research design consists of a typical set-up about how a researcher scrutinises the research inquiries. Furthermore, the design points out the process from getting the necessary data to its analysis (Creswell, 2009).

According to previous publications (Creswell, 2009; Kumar, 2005; Tashakkori & Teddlie, 2010) research can be based on three different approaches, quantitative, qualitative and a combination of both. According to Tashakkori and Teddlie (2010), quantitative and qualitative research are based on different philosophies. Qualitative researchers believe that reality is a social construct based on individual experience. As such, qualitative research provides a detailed understanding of a phenomenon from an in-depth exploration of an individual perspective. Qualitative data may be collected either (i) with the help of open-ended questions by in-depth interviews of a smaller sample of respondents, or (ii) by gathering the opinion of a small group of respondents with similar characteristics (usually 10 to 12) on several topics related to the research. The second type of qualitative research mentioned above is usually based on a focus group discussion, or FGD (Tashakkori & Teddlie, 2010).

Unlike qualitative research which underlines the importance of individual perception, quantitative research emphasises observable and measurable empirical studies (Tashakkori & Teddlie, 2010). According to Creswell (2009), quantitative research usually adopts more general forms of inquiries which come from large sample sizes.

This type of research usually works with numbers and adopts close-ended questions. On the other hand, qualitative research usually undertakes approaches with open-ended questions or is framed by using words administered to a much smaller sample compared to that of quantitative research.

Furthermore, Creswell (2009) stated that although both quantitative and qualitative approaches bring distinctive pictures and points of view, each of them has disadvantages. Since a quantitative study observes a large number of respondents, its findings can be justified for a more extensive population. However, a quantitative study often dismisses knowledge essential for an individual level of understanding. In contrast, the small number of respondents in qualitative studies restricts its capacity to generalize the findings. Hence, adopting a combination of both quantitative and qualitative findings could reduce each limitation mentioned above by highlighting the strength of each method (Creswell, 2009, p. 8).

Given that this thesis aims to offer a suitable measure of environmental behaviour and examine the variations of such behaviour according to the respondents' demographic characteristics and lifestyle, this research is based mostly on quantitative research. This quantitative study is conducted through a household survey (HS). However, to enrich the analysis and gain insights into the results of the analysis of quantitative data, qualitative data were collected through focus group discussion (FGD) on a smaller sub-sample of the original sample. A combination of quantitative and qualitative analysis would provide a more comprehensive answer to the research problems.

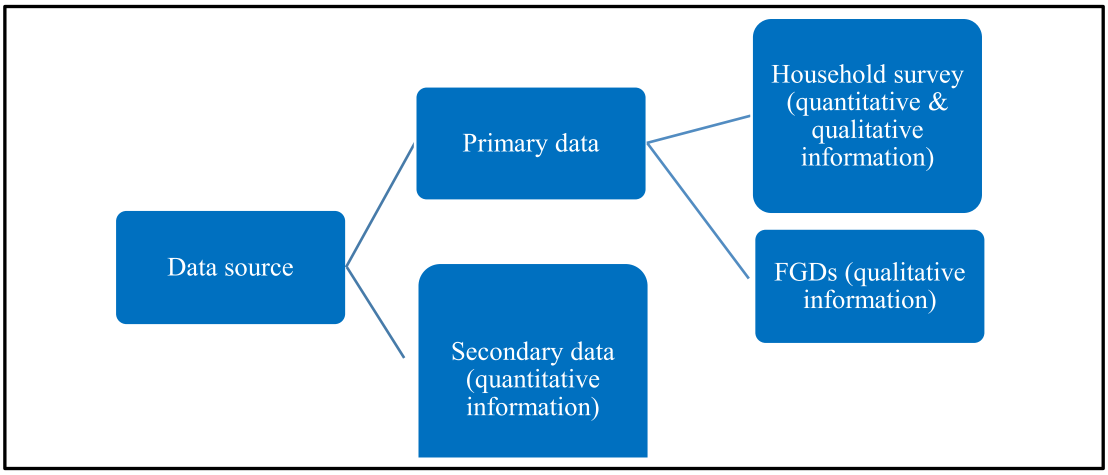
Indonesia is a large and diverse country and environmental behaviour is a multifaceted issue. Therefore, a case study approach has been adopted in this thesis by selecting the province of South Sumatra as the site of the study. According to .Yin (2009, p. 18) a case study can be defined as "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context". The case study approach is useful also because it provides the researcher with the opportunity to obtain a holistic view of complex and multifaceted issues. The rationale behind the selection South Sumatra as a case study has been mentioned at Section 1.4 in Chapter 1. This is further elaborated in Chapter 4.

While the findings of the study may not be totally generalisable for the whole of Indonesia, similar studies may be conducted in the other provinces with some common core questions and a few questions that may be typical of each province, thereby obtaining a national, uniform picture based on the common questions and a special picture of each province based on the special and common questions.

3.3 Methods of data collection

This study collected information from both primary and secondary sources (see Figure 3.1.). Primary sources refer to first-hand knowledge that was directly gathered by the researcher: secondary sources refer to data already collected by previous studies or data collecting agencies (Kumar, 2005). Collecting primary data is essential because secondary sources do not provide information about the environmental behaviour of households in South Sumatra, the focus of the present study. The primary data for this research was obtained through household survey and FGDs from a statistically selected sample of households in each district/municipality of South Sumatra, while the secondary data for the research was obtained mostly from the national socioeconomic survey of Indonesia (Susenas) conducted by the Badan Pusat Statistik (Central Board of Statistics) popularly known by its acronym BPS. As well as providing information about the gaps in available data to fulfil the objectives of the present research the secondary data are also meant to complement the information gathered from the primary data. Figure 3.1 provides a schematic representation of the data collection process used in this research.

Figure 3.1. Sources and types of data.



Source: Drawn by the author.

3.3.1 **Household survey**

The household survey (HS) obtained information about environmental behaviour needed for constructing an environmental behaviour index (EBI), which is not currently available from secondary resources. This primary data also contain information about the demographic characteristics of the members of selected households.

The questionnaire for household survey was divided into three sections to collect — (i) general information such as respondents' identity and their demographic characteristics; (ii) information about activities related to environmental behaviour needed for constructing an environmental behaviour Index (EBI); and (iii) information about the perception of the respondents in relation to their EB. The first and the second sections were structured questionnaires for collecting quantitative information, while the third section was an open-ended questionnaire for collecting qualitative information to supplement and elaborate on the information gathered through the structured questionnaires, especially that on EB. The structured questions were adapted from previous studies, pilot-tested on ten households in each of Lahat City and Palembang and revised based on the results of the pilot-test before administering the questions to the statistical sample of households. The open-ended questions for collecting qualitative information are formulated by the researcher to elaborate on the critical questions of the structured questionnaire. Copies of the questionnaires are attached in appendix 2.

Information on the demographic characteristics collected in this research includes the respondents' domicile (urban/rural or regency/city), age, household size, sex, marital status, education and occupation. Information about environmental behaviour includes the daily activities of the household that can affect the conservation of the environment and environmental sustainability. Since activities concerning the sustainability of environmental conservation can be broad and diverse, the questions formulated in this research include questions on activities that correspond to the daily activities that could help sustain natural resources by promoting resource conservation and waste reduction, including the three Rs activities — reduce, reuse and recycle.

3.3.1.1 *Indicators of environmental behaviour*

Like it has been discussed in Chapter 2, environmental behaviour (EB) is multidimensional. In the present research, environmental behaviour is postulated on people's behaviour with regard to six dimensions of daily living, namely food, water, energy, transport, housing and waste disposal. People's environmental behaviour is measured through an environmental behaviour index (EBI), constructed as a composite index based on the indicators of the various dimensions of EB. The EBI score (or EBI value) is based on the scores or values of 30 variables selected from the responses to a list of questions adapted from previous studies. These variables symbolise the six dimensions of consumption in Indonesia stated above.

The variables in each dimension are adopted from previous studies. For each variable, respondents are asked to respond to questions about 'how frequently do you engage in the activities listed below?', and select one of five given possible answers: 1 (never), 2 (seldom/rarely), 3 (occasionally/sometimes), 4 (frequently), 5 (every time). In addition to these probable answers, the respondents are also provided with a choice of '6', for some activities that have a possibility of being 'not applicable to them'. In this study, each dimension has a different a number of variables adopted from several sources.

Dimension 1: Food consumption

Table 3.1 provides a summary list of food items, the frequency of their consumption and the score given to each food item according to its frequency of consumption.

Table 3.1. Summary of variables in the food dimension.

Questions	Activities	Code	Response and score
How frequently do you engage in the activities listed in the next column?	1. Consuming local food 2. Consuming fruit /vegetables 3. Consuming imported food 4. Consuming chicken/poultry 5. Consuming beef 6. Consuming fish or seafood 7. Consuming mineral water (bottled water) 8. Consuming home-grown food	*A1* *A2* *A3* *A4* *A5* *A6* *A7* *A8*	1 = Never 2 = Seldom/rarely 3 = Occasionally/sometimes 4 = Frequently 5 = Every time 6 = Not applicable

Source: Fieldwork (2016).

The continuing trend of population growth in Indonesia implies that the demand for food will also increase. An increased demand for food means an increase in demand for land, water and energy to create the food and to dispose of its related waste, however, not all foods are created (produced, transported, stored, prepared, and served) equally. Hence some foods take up more environmental resources than others. For example, the production of meat (especially beef) takes up large quantities of water (and food for the cattle) (Hoekstra & Chapagain, 2007), so eating more meat would be environmentally unfriendly. Likewise, transporting imported food takes more fossil fuels producing more carbon emissions than local food, thus consuming imported food would be less environment-friendly. As the kinds of food people choose to consume might have a greater impact on the environment, to help conserve the environment, people should choose food wisely by consuming environmentally friendly food only.

While selecting the food consumption variables, this research adopted Greendex's indicators (National Geographic & Globescan, 2014). The Greendex is a pioneering study that measures and monitors consumer progress towards "environmentally sustainable consumption around the world" (National Geographic & Globescan, 2014). The Greendex was conducted online to measure green consumer behaviour by scoring people's responses on their consumption for housing, transportation, food, and other goods and services. The Greendex data is reported by National Geographic and GlobeScan and has been published every two years since 2008. The Greendex scores are measured according to four factors: housing, transport, food and goods and services (everyday consumption and big ticket items).

Concerning food-friendly behaviour, Greendex used eights variables as the indicators, i.e. local food, fruit and vegetables, imported food, chicken and poultry, beef, fish and seafood, bottled water and home-grown food (National Geographic & Globescan, 2014). This thesis adopted these eight variables as its environmental behaviour variables in the food dimension (see Table 3.1). Some of those variables refer to food-friendly behaviour. These food-friendly variables included local food, fruit and vegetables, and home-grown food. The other food variables, i.e. chicken and poultry, imported food, beef, fish and seafood and bottled water were considered environmentally unfriendly commodities.

Dimension 2: Water consumption

Table 3.2 provides a summary list of variables in the water dimension, the frequency of their use and the score given to each according to its frequency of use.

Table 3.2. Summary of variables in the water dimension.

Questions	Activities	Code	Response and scale
How frequently do you engage in the activities listed in the next column?	1. Checking leaks (piped water)[31] 2. Having shorter showers 3. Using minimal water in the kitchen 4. Re-using grey water (from washing vegetables/fruit /rice, ablutions, etc.)	*A9* *A10* *A11* *A12*	1 = Never 2 = Seldom/rarely 3 = Occasionally/sometimes 4 = Frequently 5 = Every time 6 = Not applicable

Source: Fieldwork (2016).

In the dimension of water consumption, this research adopted approaches from Fielding et al. (2012), (National Geographic & Globescan, 2014) and BPS (BPS, 2013c) in framing the water-friendly behaviour. Based on the studies cited here, water-friendly behaviour is measured in terms of the frequency of activities for water curtailment and for re-using greywater[32]. Thus, to measure water-friendly behaviour, this research adopted four questions from *Survei Perilaku Peduli Lingkungan Hidup* — SPPLH (BPS, 2013c), i.e. (1) checking and fixing the water leakage, (2) saving water while taking a bath or showering, (3) saving water while cooking and (4) re-using greywater. All of these variables refer to EFB, which means the more often a respondent does these activities, the more environmentally friendly the respondent is.

Dimension 3: Energy consumption

With respect to the dimension of energy consumption, this research adopted approaches from Abrahamse and Steg (2011) and SPPLH (BPS, 2013c). Based on these studies, this research framed the energy friendly behaviour as activities that minimise the creation of GHG emission while consuming energy (for lighting, heating, cooling and cooking) in daily life.

To measure EgB, four questions from SPPLH (BPS, 2013c) were adopted. These four questions were (1) turning off electrical devices when they are not being used, (2)

[31] If a household does not have pipe facilities at home, the respondent could answer '6' = not applicable.

[32] Greywater is relatively clean wastewater, such as the wastewater from baths, washing machines, sinks or other kitchen appliances.

using firewood or other solid fuel for cooking, (3) covering the pot/pan when cooking and (4) using energy-saving electric light bulbs. Most of these variables, except the second variable i.e., using firewood or any other solid type of fuel for cooking, refer to EFB. However, the question about using firewood or solid fuel for cooking was asked because many people still use such fuel, and the less they use such fuel, the more environmentally friendly they are. Table 3.3 provides a summary list of variables concerning energy, the frequency of use and the score given to each according to its frequency of use.

Table 3.3. Summary of variables in the energy dimension.

Questions	Activities	Code	Response and scale
How frequently do you engage in activities listed in the next column?	1. Turning off electrical devices when they are not used[33] 2. Using firewood or any other type of biomass for cooking 3. Covering pot/pan when cooking 4. Using energy-saving bulbs[33]	A13 A14 A15 A16	1 = Never 2 = Seldom/rarely 3 = Occasionally/sometimes 4 = Frequently 5 = Every time 6 = Not applicable

Source: Fieldwork (2016).

Dimension 4: Mode of transport

Regarding the transport mode dimension, this research adopted approaches from SPPLH (BPS, 2013c), which assumes environmentally friendly transport practices as activities to minimise the creation of carbon emission in the atmosphere when travelling. The SPPLH used several questions, including the use of public transport, use of low carbon emission fuel, reducing the use of private vehicles and maintaining the vehicle's fuel efficiency, low carbon dioxide emission and smooth running. This research adopted all these variables, which are conducive to EFB. In the questionnaire for the present study, these variables are renamed as frequent use of public transport, frequent use of low carbon fuel (using Pertamax other than Premium), frequent efforts to reduce the use of private transport and to maintain the vehicle's fuel efficiency, low emission of carbon dioxide and smooth running. The questions, activities, codes and scores for this dimension are given in Table 3.4.

[33] If a household does not have electricity facilities at home, the respondent could answer '6' = not applicable.

Table 3.4. Summary of variables in the transportation dimension.

Questions	Activities	Code	Response and scale
How frequently do you engage in the activities listed in the next column?	1. Using public transport 2. Using Pertamax/Pertalite (other than premium)[34] 3. Reducing the use of private transport[34] 4. Maintaining vehicle's machinery service[34] 5. Conducting emission test routinely[34]	*A17* *A18* *A19* *A20* *A21*	1 = Never 2 = Seldom/rarely 3 = Occasionally/sometimes 4 = Frequently 5 = Every time 6 = Not applicable

Source: Fieldwork (2016).

Dimension 5: Resource consumption for housing

For the dimension on resource consumption for housing, this research framed housing friendly behaviour as activities related to installing housing facilitations to support an EFB (BPS, 2013c; Fielding et al., 2012). For this, five variables were included. Four of these variables were adopted from SPPLH (BPS, 2013c) and one from Fielding et al. (2012). These variables included (1) providing a septic-tank for defecation facilities, (2) providing infiltration trenches, or biopore infiltration holes[35], or garden/turf in the home environment, (3) growing/maintaining perennials/yearly plants at home and (4) providing separate bins for organic/inorganic waste. All four variables describe environmentally friendly activities. Table 3.5 provides a summary list of variables in the housing resource dimension, and whether the household has these variables.

Table 3.5. Summary of variables in the housing dimension.

Questions	Activities	Code	Response and scale
Do you have the facilities listed in the next column at home?	1. Toilet with septic-tank 2. Infiltration trenches, or biopore infiltration holes, or garden/turf in the home environment 3. Perennials/annual plants 4. Separate bins for organic/inorganic waste.	A27 A28 A29 A30	1 yes 0 no.

Source: Fieldwork (2016).

[34] If the household does not have a private vehicle at home, the respondent could answer '6' = not applicable.

[35] According to Blackwell, Green, and Mason (1990) biopore refers to channels underground created by roots and soil animals such as worms, termites, plant roots, etc. The biopore infiltration hole is a cylindrical hole (usually coated with plastic pipe), with a diameter of 10 cm, planted with a depth of 100 cm vertically in the ground (Brata & Nelistya, 2008).

Dimension 6: Waste disposal

Finally, for the waste disposal dimension, this research adopted the SPPLH approach (BPS, 2013c) to analyse the waste disposal friendly behaviour of people. The waste disposal friendly is framed in terms of the principle: do not litter and do recycling activities (BPS, 2013). The variables included in this analysis are: (1) littering, (2) sorting waste at home, (3) composting, (4) dumping waste directly into a drain/river, (5) burning the waste. While questions (1), (4) and (5) refer to environmentally unfriendly activities, the other two refer to environmentally friendly activities. Table 3.6 summarises the activities of the households in the waste disposal dimension, and the frequency of such activities.

Table 3.6. Summary of variables in the garbage disposing activities.

Questions	Activities	Code	Response and scale
How frequently do you engage in the activities listed in the next column?	1. Littering 2. Sorting the garbage at home 3. Composting the garbage 4. Dumping the garbage directly into drain/river 5. Burning the garbage	*A22* *A23* *A24* *A25* *A26*	1 = Never 2 = Seldom/rarely 3 = Occasionally/sometimes 4 = Frequently 5 = Every Time

Source: Fieldwork (2016).

3.3.1.2 *Perception*

Besides collecting quantitative data about the respondents' demographic characteristics and their behaviour on six dimensions of the environment, the HS included gathering qualitative information from the respondents. The qualitative information consisted of how the respondents defined environmental behaviour in their daily life, and how they rated their behaviour on a scale of 1 to 5, where 1 = very unfriendly, 2 = unfriendly, 3 = neutral, 4 = friendly and 5 = very friendly according to their definition.

3.3.2 **Focus group discussions**

According to the theory of planned behaviour (Ajzen, 1991), the best predictor of behaviour is the intentions of people responding. This intention can be predicted by three variables, i.e. attitudes, perceived behavioural control and subjective norms (Ajzen, 1991). According to Ajzen (1991), attitudes refer to the way people evaluate whether performing a behaviour is positive or negative. Subjective norms refer the extents to which people think that their significant others expect them to perform that behaviour. Perceived behavioural control reflects the extent to which individuals perceive the behaviour is within their control and suggests whether the behaviour is easy or hard to accomplish.

This research collected qualitative data to complement the results of the quantitative data collected in household surveys. This qualitative data addressed several open-ended questions at small group levels, including:

1. What are the attitudes of the respondents towards the environment?
2. How did the respondents perceive their norms related to the environment?
3. Were there any barriers or opportunities faced by the respondents in practising environmentally friendly behaviour in their daily life?
4. How did these attitudes, norms, barriers affect the respondents' intentions to engage in environmentally friendly behaviour?

Several focus group discussions (FGDs) were organised in order to answer the above questions. According to Krueger (2009, p. 5) "a focus group is a carefully planned series of discussions designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment". For many years, FGDs have been viewed as essential qualitative data-gathering techniques, which complement or supplement in-depth interviews. The difference between the two is that, while an in-depth interview involves asking an individual, detailed and often open-ended questions in-depth, the FGD consists of discussing issues relevant to the research among a group of people (Kumar, 2005). During an FGD, members of the group express their opinion regarding a specific topic introduced by the researcher, without pressure to vote or to reach a consensus, and in order to ensure free and impartial opinion by the members of a focus group, the members of the group are chosen so that they are similar in socioeconomic characteristics (Krueger, 2009). Further, to ensure smooth and timely completion of an FGD, the number of participants in a focus group—typically should not exceed 10 or 12.

3.4 Population and sampling design

3.4.1 Population

Several nation-wide surveys re conducted in Indonesia on a regular basis and a population census is conducted once every 10 years. However, for surveying and monitoring people's environmental behaviour one needs the surveys to take place at periods of less than 10 years. In this sense, the Susenas (Survei Sosial Ekonomi Nasional or National Socioeconomic Survey) is ideally suited for its continuity, frequency and flexibility for the possibility including a module about environmental behaviour. That is why the population (or universe for sample selection) in the present research consists of the respondents of Susenas (Survei Sosial Ekonomi Nasional or National Socioeconomic Survey), a routine socioeconomic inquiry by BPS. In 2016, Susenas was conducted twice, in March and September. These two surveys gathered information from different respondents, however several selected topic areas covered in the March survey were revisited in September. For the purposes of this study, this research collected data from a sub-sample of the respondents of the March survey. The primary data collection for the present study coincided with the survey conducted in September. The respondents selected for this research were interviewed face to face by trained enumerators selected for this purpose using the questionnaire discussed in the previous section.

In Indonesia, Susenas provides an important source of information to describe the socioeconomic conditions of Indonesian society. It provides socioeconomic data including education, health, housing, crime, sociocultural characteristics, domestic travel and household welfare. Susenas was first held in 1963 (BPS, 2014a), however, in its early stages, Susenas was not conducted at regular intervals. Some years later, in 1992, Susenas began to be conducted annually (BPS, 2014a). The frequency of Susenas data collection was increased from once a year to twice a year up to 2010. The frequent of this survey increased again in the next period as during 2011–2013 Susenas was conducted once every three months, i.e., quarterly (BPS, 2014a). In 2014, it was planned to continue to conduct Susenas, however, due to budget constraints, the 2014 Susenas was conducted only for three-quarters of that year and the survey for the fourth quarter was cancelled. Starting in 2015 and then later in 2016, Susenas was carried out twice a year, i.e., in March and September (BPS, 2014a, 2016e, 2016g).

In 2016, the March survey aimed at collecting information for district-level analysis, while that in September was designed to gather information at provincial level of analysis (BPS, 2016e). As such, the data collected in March is from a larger sample than in September. Nationally, the sampling frame of Susenas covers the entire population of Indonesia based on the latest Population Census.

In 2016, the year coinciding with the timing of the fieldwork for the present study, the Susenas sampling frame consisted of all households listed in the 34 provinces of Indonesia as at the 2010 Population Census. To select its respondents, Susenas adopted a multistage design with a probabilistic sampling strategy called 'two-stage and one-phase stratified sampling' (BPS, 2016, p 14). Based on this strategy, all the households in all the geographical areas are arranged by size from the largest area (country) to the smallest area (census blocks — CBs)[36].

According to BPS (2014, p.12), a CB is the working area of an enumerator in a BPS inquiry (a census or a survey). The characteristics of a CB are as follows:

1. A CB is a part of a hamlet or RT/RW. Each hamlet or an RT/RW can be divided into one or several CBs.
2. A CB must have clear/recognisable boundaries. These boundaries could be either natural or administrative. However, the boundaries of a local administrative unit (RT, RW, hamlet, neighbourhood, etc.) are preferred as the boundaries of a CB when these legal administrative boundaries clear.
3. One CB must be located in a single area.
4. Each CB should have, on average, 80 to 120 households.

The sample of the September 2016 Susenas is a subset of the March 2016 Susenas. The primary units of analysis of the two Susenas's mentioned above were selected by adopting a two-stage stratified sampling, (BPS, 2016e, p. 14).

In the March 2016 Susenas, the first stage of the sampling design determined the numbers of the smallest area to be visited in each regency/city. For this, Statistics Indonesia selected 25% of the all CBs by probability proportional to size (PPS) method

[36] The smallest administrative area in Indonesia is called a hamlet in rural areas, and 'Rukun Tetangga/Rukun Warga' (RT/RW) in urban areas. However, for its internal purposes, BPS has adopted a different term, known as a census block (CB) for the smallest geographic area of its areal sampling framework.

(BPS, 2014a; 2016e, p. 14). In this case, the size means the number of SP2010 households in each stratum, where the stratification was done according to three levels of household welfare in each urban and rural areas. Thus, there were six strata of CBs. The second stage was selecting an 'n' number of urban/rural CBs in every regency/city by systematic sampling in each stratum, to get an equally distributed representation of urban and rural areas so that the data provides demographically unbiased results. This stage was followed by a third phase which is the selection of the final units of analysis, namely the households. The respondents in the survey were the heads of the selected households (or their representatives). This stage consisted of selecting ten households from every CB by systematic sampling with the level of education of the household head as the implicit stratification with a random start (BPS, 2016e, p. 14).

Based on the sampling strategy described above, the data collection for Susenas in March 2016 was done by interviewing 300,000 household heads or their representatives (ten household heads from each of the 30,000 CBs selected in the sample) which were distributed across 34 provinces and 511 regencies/cities all over Indonesia (BPS, 2016e, p. 5). Of these, approximately 9,800 households were located in South Sumatra, consisting of 3,120 households in urban areas (ten households selected by systematic sampling from each of the 312 CBs in urban areas) and 6,680 households from rural areas (ten households from each of the 668 CBs selected by systematic sampling in the rural areas (BPS, 2016e, p. 54).

The total sample for Susenas in September 2016 was 75,000 households, which was equal to 25% of its sample on March 2016 (BPS, 2016e, p. 14; 2016g, p. 12). The first stage of sampling design by Susenas in September 2016 was to select 25% of the CBs of the Susenas in March 2016. The selection was by considering the distribution of CBs in each stratum in the regency/city level. The second stage was selecting ten households from every CB by systematic sampling using the level of education of the household head as the implicit stratification. Since the random starts[37] of the household selection for March and September data collection in each CB were unique and the households sampling frame was continually updated before the surveys, the samples

[37] Systematic sampling involves selection of every n^{th} subject in the population to be in the sample. Before I start selecting subjects, we need to select a random starting point on the list. I would use a random number table to determine the starting point. This starting point is called the random start.

of households in September 2016 were mostly different from their counterparts in March 2016.

The distribution of the sample of CBs in South Sumatra as at March 2016 according to regency/city is shown in Table 3.7. To repeat, the heads of ten households (or their representatives) were interviewed from each selected CB.

Table 3.7. Distribution of Susenas sample in South Sumatra as at March 2016 and September 2016.

No.	Regency/City	Allocated sample					
		Sample of CBs as at March 2016			Sample of CBs as at September 2016 by BPS		
		Urban	Rural	Total	Urban	Rural	Total
1	Ogan Komering Ulu — OKU	24	36	60	6	9	15
2	Ogan Komering Ilir — OKI	8	64	72	2	16	18
3	Muara Enim	16	56	72	4	14	18
4	Lahat	16	48	64	4	12	16
5	Musi Rawas — MURA	4	48	52	1	12	13
6	Musi Banyuasin — MUBA	8	56	64	2	14	16
7	Banyu Asin	16	56	72	4	14	18
8	Ogan Komering Ulu Selatan — OKUS	4	48	52	1	12	13
9	Ogan Komering Ulu Timur — OKUT	8	56	64	2	14	16
10	Ogan Ilir	12	48	60	3	12	15
11	Empat Lawang	4	44	48	1	11	12
12	Penukal Abab Lematang Ilir —PALI	4	28	32	1	7	8
13	Musi Rawas Utara — MURATARA	4	32	36	1	8	9
14	Palembang	76	4	80	19	1	20
15	Prabumulih	40	12	52	10	3	13
16	Pagar Alam	28	20	48	7	5	12
17	Lubuklinggau	40	12	52	10	3	13
	South Sumatra	312	668	980	78	167	245

Note: ten households were selected by systematic sampling with a random start from each selected CB.
Source: Prepared by the author based on BPS (2016e, p. 54; 2016g, p. 37).

The present study mainly utilised secondary data collected by Susenas in March 2016. It was assumed that the March 2016 Susenas data would be available by the time the primary data for the present study was collected during August to October 2016; and that it would be possible to merge the primary data for the present study with the March 2016 Susenas data. It should be noted that the respondents for the present study were a subset of the respondents of Susenas of March 2016 and had the same ID[38] as those of the Susenas respondents, making it possible to merge the two datasets. Data collection for the present study was timed for August to October 2016 also because it would be possible to request the BPS to instruct its enumerators to use the

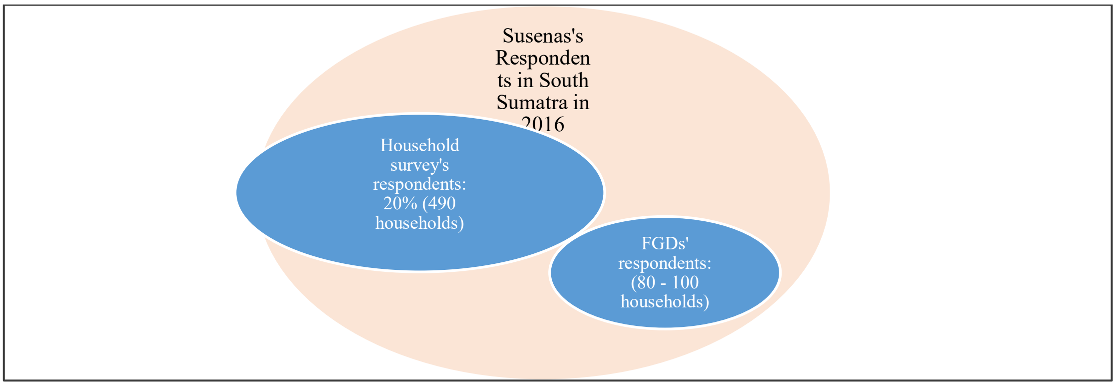
[38] ID refers to identity code in the datasets.

questionnaires for the present study and collect the needed primary data, when these enumerators revisited the CBs in September 2016. Table 3.7 shows the number of allocated sample of CBs in Susenas of March 2016 and Susenas of September 2016.

3.4.2 **Sampling design**

Basically, the sample for the present study comprised a 20% sub-sample of CBs of the September 2016 Susenas sample for South Sumatra referred to here as the household survey (HS). The focus groups discussion participants (FGDs) also comprised a sub-sample of the CB samples for the September 2016 Susenas, to collect qualitative information from selected respondents (see Figure 3.2). To get a representative sample of respondents covering all geographic areas of South Sumatra, this research adopted a sampling design based on the sampling method designed by Susenas.

Figure 3.2. Population and the sample of this research.



Source: Drawn by the author.

3.4.2.1 ***Household survey***

The Household survey (HS) for the present study consisted of a two-stage design, in which sampling was done sequentially from four hierarchical structures of the population of South Sumatra. The first structure in the hierarchy is the province of South Sumatra, the second is the regency/city, the third consisted of the CBs and the fourth is the household. This two-stage sampling started with the selection of the regencies/city at the first stage (because the selection of South Sumatra is a given) and selection of CBs from the selected regencies/city as the second stage. The households that were selected by BPS in its Susenas of March 2016 were also selected for the present study (thus the households were also given). The entire process consisted of four steps as described below:

The first step was to determine how many of the CBs revisited in September 2016 at the Susenas were to be visited in the present study. This was done by keeping in mind the representativeness of demographic-diverse respondents in the sample. The Susenas in September 2016 captured 25% of CBs visited in March 2016 meaning 25% of all household populations surveyed in March 2016, covering all the regencies/cities of South Sumatra. However, it was considered sufficient for the present study to take four regencies and one city to ensure geographical representation of South Sumatra. These selected regencies are: Ogan Komering Ilir or OKI (in the east), Lahat (in the west), Musi Banyuasin — MUBA (in the north), Ogan Komering Ulu Selatan — OKUS (in the south) and the city of Palembang (in the centre). Considering the time and budget constraints for the present study, it was decided to select 20% of the CBs from the September 2016 Susenas sample i.e. 49 CBs, which is 20% of 245 (with 16 in urban and 33 in rural areas) from the four selected regencies and one city. In each selected CB, the same ten households were selected for interview as were selected in the March 2016 Susenas. This finally resulted in selecting a total of 490 households in the present sample with 160 households from urban areas and 330 households from rural areas. This sample size for the present study is sufficiently large for statistical purposes and is also manageable in terms of the available time and cost.

Table 3.8. Allocation Susenas census blocks (CBs) samples in household survey for the present study.

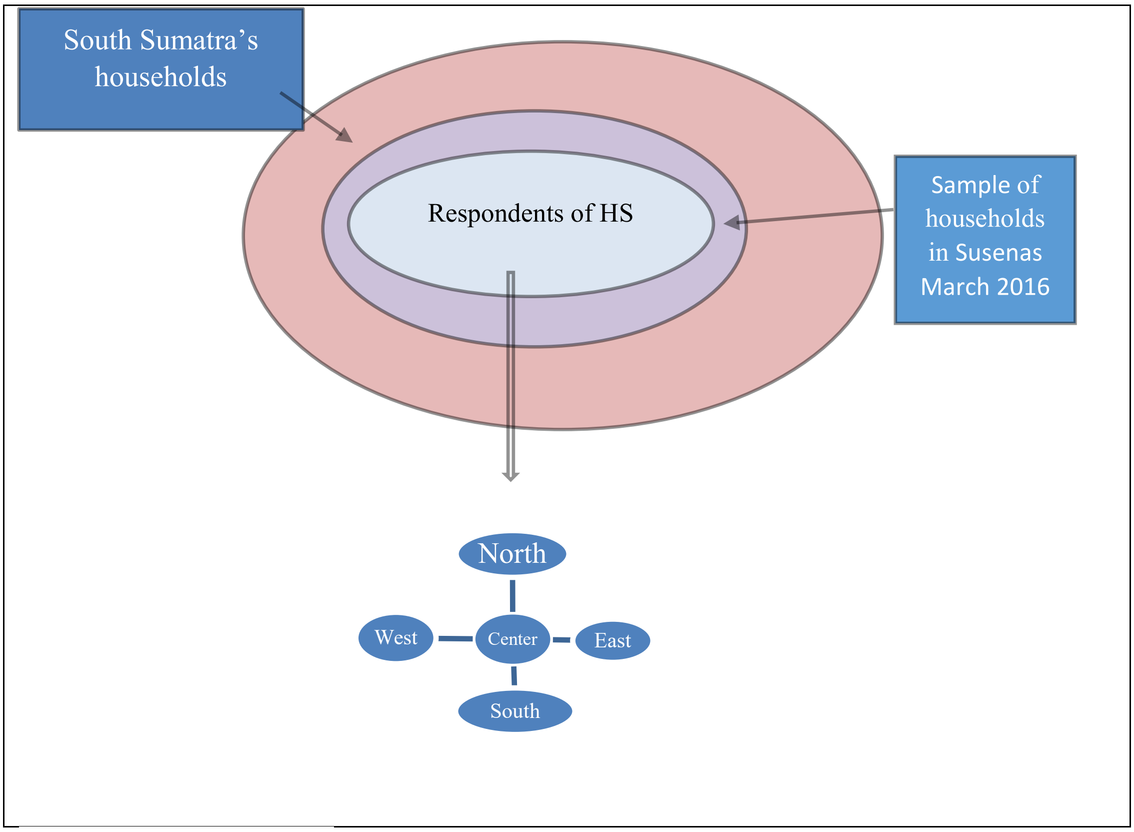
No.	Regency/city	Number of selected CBs		
		Urban	Rural	Total
1	OKI	2/28x16 =1	16/55x33 =10	11
2	Lahat	4/28x16 =2	12/55x33 =7	9
3	MUBA	2/28x16 =1	14/55x33=8	9
4	OKUS	1/28x16 = 1	12/55x33=7	8
5	Palembang	19/28x16 =11	1/55x33=1	12
	Total for the present study	16	33	49
	Total CB South Sumatra (from Table 3.7)	78	167	245
	Total number of CBs in the 5 selected regencies/city in the September 2016 Susenas revisit (from Table 3.7)	28	55	83
	Total number of CBs for the present study = 20% of the total number of CBs in South Sumatra; i.e., 20% of 245 = 49	78/245x49 =16	167/245 x 49 =33	49

Source: Fieldwork (2016).
Note: Ten households were systematically selected for every selected CB by BPS — Susenas.

Table 3.8 explained how we distributed the HS's samples in geographically dispersed South Sumatra. To repeat, BPS South Sumatra would revisit 245 CBs in September

2016, whereas the total sample of CBs for the present study is 20% of 245 which is equal to 49 CBs. This total number of 49 CBs is distributed in the urban areas and rural areas of the province in the same proportion in which the CBs of urban and rural areas are distributed in the September 2016 Susenas revisit (78 in urban areas and 167 in rural areas, see Table 3.8). Thus, for the present study, the sample of CBs in urban areas is (78/245) times 49 = 16 and that in rural areas it is (167/245) times 49 = 33 (see Table 3.8). Further, remembering that in the revisit sample of September 2016 Susenas, the five regions selected for the present study as stated above, comprise 83 CBs (28 in urban and 55 in rural areas), the urban/rural distribution of the sample of CBs in the five selected regencies/city for the present study is obtained by taking the same urban/rural distribution of CBs used in the September 2016 Susenas revisit. For example, the number of urban CBs in Palembang for the present study is obtained by (19/28) times 16 = 11. The sample of CBs in urban and rural areas in the five selected regencies/city for the present study is shown in Table 3.8. Whereas an illustration of the population and the distribution of respondents of HS is provided in Figure 3.3.

Figure 3.3. Household survey for the present study in the context of the population of South Sumatra and the Susenas sample as of March 2016.



Source: Drawn by the author.

The second step in the data collection consisted of determining which CBs would be selected as the samples in each regency/city. This was done by the following method:

1. By dividing the distance from the central business district (CBD) to the farthest point in the selected district in three equal distance categories, namely (i) closest, (ii) in-between and (iii) farthest.
2. In each selected district, the CBs were selected in such a way that one-third of the sample fell in the first category (closest), one-third in the second category (farthest) and the final one-third in the third category (in-between).

The fourth step was to ensure that male and female respondents were represented approximately equally in the data collection. Therefore, if the head of the first sample household was male and was interviewed, and if the head of the second household also male, then, with his permission his wife was interviewed, and vice-versa.

3.4.2.2 ***Focus group discussion***

Following Krueger (2009) referred to in Section 3.3.2 above, several focus groups were organized with group participants having similar socioeconomic characteristics. Members of focus groups comprised heads of households or their representatives who were not selected in the sample for the HS. Each focus group was homogeneous with respect to education and gender. Gender balance in the focus groups was attempted by inviting equal numbers of male and female participants to the focus groups.

Two focus groups were formed with ten participants per group in each of the five selected regencies/city, one group comprising male members and the other group comprising female members as suggested by Krueger (2009). The size of each focus group was ten, so that in all there were 100 focus group participants in this study. Thus, the method of respondent selection for the FGDs was as follows:

1. Selecting one CB in every sampled regency/city using purposive sampling keeping in view that this Census Block was not selected for the HS. Accessibility of the selected CB for focus group discussions was another consideration. Thus, a total of five CBs was selected from the five sampled regencies/city. It is acknowledged that selecting the most accessible CB might introduce some bias in the FGDs in that the residents of the most accessible CBs might have a different perspective on environmental behaviour from those who live in less accessible CBs, but the

decision to select focus group participants from the most accessible CBs was taken keeping in mind time and cost constraints.

2. Making sure that FGDs covered participants from all levels of education. This was done by selecting participants from specific levels of education in each sampled CB, based on the categorisation of households in Susenas's household sampling framework (BPS, 2016f, p. 22). For example, FGDs in regency/city A were for participants whose household heads' education was below Junior High School (JHS — equal to nine years old study), while FGDs in regency/city B were for participants whose household heads' education was equal to JHS, and regency/city C were for participants whose household heads' education was equal to senior high school (SHS — equal to 12 years old study) and above. The details of this arrangement were finalized based on information from the sampling frame of South Sumatra's March 2016 Susenas.
3. Selecting 20 households from every selected CB and making sure that these selected households were not selected for the quantitative survey, even if the particular CB was a part of the household survey.
4. Arranging two focus groups (FGs) in each selected CB — one comprising male participants and the other comprising female participants. As such, the total number FGs in all five selected districts was ten; five FGs for males and five for females.

Table 3.9. Number of respondents of focus group discussions (FGDs) by regency/city.

Regency/city		No. of CBs	Focus groups (FGs) male respondents)		Focus groups (FGs) female respondents		Total	
			No. of FGs	No. of participants	No. of FGs	No. of participants	No. of FGs	No. of participant s
1	OKI	1	1	10	1	10	2	20
2	Lahat	1	1	10	1	10	2	20
3	MUBA	1	1	10	1	10	2	20
4	OKU Selatan	1	1	10	1	10	2	20
5	Palembang	1	1	10	1	10	2	20
Total Number of Focus Group CBs in South Sumatra		5	5	50	5	50	10	100

Source: Drawn by the author.

3.5 Data quality assurance and background information of the research area

3.5.1 Approval and pilot survey

The household survey for the present study was conducted in the Indonesian province of South Sumatra over three months from 4 August to 3 November 2016. This time was allotted in order to obtain official permissions to conduct the research in the five selected regencies/city in South Sumatra, to train the enumerators, to conduct a pilot study to test the questionnaires, to complete the quantitative data collection and its supervision and to conduct the focus groups. The pilot studies were done in two days, one day in Lahat City and one day in Palembang. The analysis of the pilot surveys were finished in one day. The starting date of the data collection was 1 September 2016 and it completed at 31 October 2016.

A number of official procedures were necessary to satisfy research ethics requirements, and to get approval to collect data in Indonesia. Before going to Indonesia for the fieldwork, the author had to obtain approval from the Social and Behavioural Research Ethics Committee (SBREC) of Flinders University. The approval was granted on 15 July 2016 (see Appendix 1.1).

Subsequently, three more approvals had to be obtained in Indonesia before starting the fieldwork. These approvals are (i) approval from BPS Provinsi Sumatera Selatan — Statistics South Sumatra Province to use its local enumerators and conduct the research simultaneously with its national data collection in the five regions, (ii) approval from the Kesbangpol — Kantor Kesatuan Bangsa dan Politik (National Unity and Politics Office), to conduct the fieldwork in Indonesia, and (iii) approval from all the village heads in the sampling area, to get permission to interview some of the locals and also to get permission to conduct the FGDs. Permissions for (ii) and (iii) included the permission to conduct pilot studies to test the questionnaires and revise them if needed and ascertain the time required to complete an interview. Approval from the Kesbangpol required going through several steps such as the national level in Jakarta, the provincial level in Palembang and regency levels in Palembang, Lahat Regency, OKUS, OKI and MUBA. Approvals from Kesbangpol are provided in Appendix 1.2.

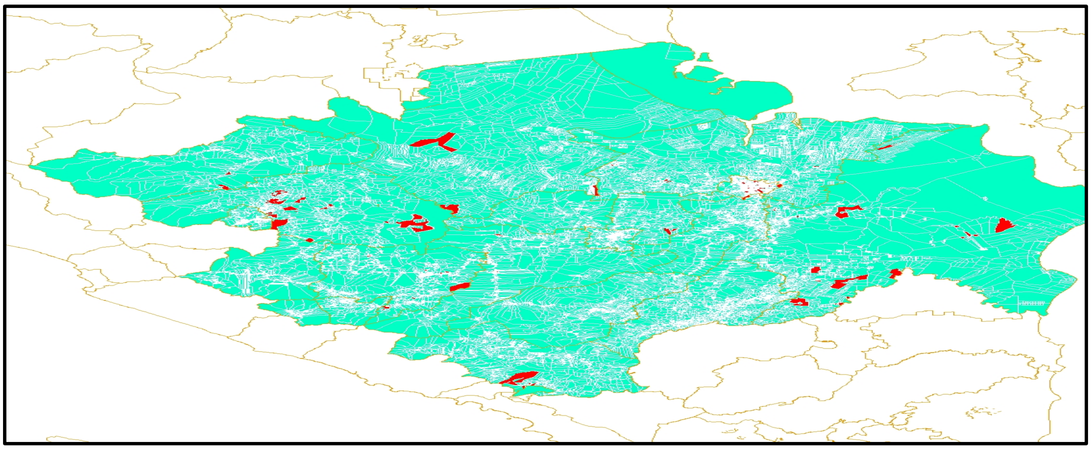
Finally, approval at the village level also had to be obtained, but this was obtained as verbal approval, which is considered to be sufficient.

The pilot study was conducted by interviewing ten purposively selected respondents, five in Lahat Regency and the other five in Palembang. During pilot study, we found out that the interview process for a respondent took time of around 45 to 60 minutes. We also notice that all respondents of the pilot study provided a homogeneous answer to previous variable A9 (using gas for cooking) as a consequence of a national policy for converting kerosene to LPG use in cooking initiated in 2007 (see Peraturan Presiden — Perpres No 104, 2007), then we decided to change this indicator to firewood/biomass to get more varied answers.

3.5.2 **Enumerators for the household survey (HS): Selection, training and supervision**

It has been mentioned earlier that the household survey for this thesis took place in 49 census blocks (CBs) located in 16 urban areas and 33 rural areas (see Section 3.4.2.1) in OKI, Lahat, MUBA, OKUS and Palembang. The red areas in Figure 3.4 show the sites where primary data for this study were collected.

Figure 3.4. Location of household survey in South Sumatra.



Source: Drawn by the author.

Collecting data at a household level is not without challenges. For this study, such challenges included the remote and dispersed locations of the sample CBs, time constraints and limited funds. Therefore, in order to ensure good quality data, the services of well-trained and experienced research assistants were used to work as enumerators. These research assistants were the enumerators who were also collecting data for Susenas in the same CB at the same time. Other than time and cost efficiency, these data collectors were employed because they are natives of the respective CBs, have knowledge of local conditions and local traditions, know the local language/dialect, were known to the local people, and have experience of collecting data in the local area, and because of their experience they are conversant with the definitions and concepts.

Based on a recommendation from BPS South Sumatra, this research employed 49 enumerators and one enumerator worked in one CB to interview all targeted samples in that CB, i.e. ten households. As noted above these enumerators were BPS's employees who collected the September 2016 Susenas data in the same CBs. As such, they could conduct the HS and Susenas simultaneously. Detailed information on enumerators is provided in Table 3.10.

Table 3.10 Targeted sample size, number of enumerators based on educational attainment; and the targeted allocation of respondents per enumerator.

No	Regency	Target sample (persons)	Number of enumerators (persons)	Enumerator based on education (persons)		Target sample per enumerator
				Graduated from high school	Holding diploma level or above	
1.	OKI	110	11	3	8	10
2.	Lahat	90	9	0	9	10
3.	MUBA	90	9	2	7	10
4.	OKUS	80	8	3	5	10
5.	Palembang	120	12	7	5	10
South Sumatra		490	49	15	34	10

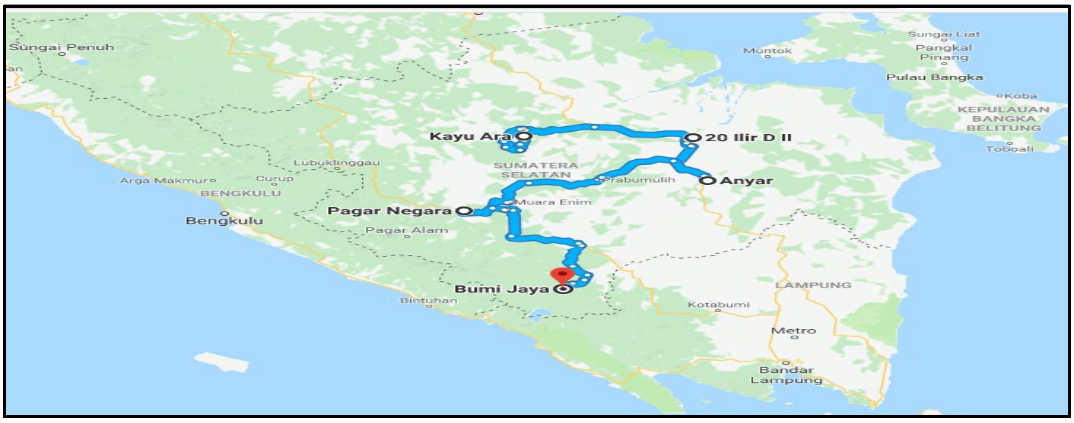
Source: Prepared by the author.

The training of enumerators was done six times in different areas. The first training was at the provincial level at an event conducted by BPS South Sumatra, known as the 'training of the Susenas's trainers in South Sumatra'. During this training, the author of this thesis met with the South Sumatra based Susenas national instructors and Susenas regional instructors. At this meeting, the primary researcher introduced the household survey (HS), its standard operating procedure (SOP) and its concepts and definitions. The standard operational procedures include (1) attend the data collection training beforehand, (2) adopt uniform concepts and definitions as specified during the training; and (3) interview the respondent only at their residence. The participants gave their feedback and inputs about strategies to be adopted in the field to minimise nonresponses. The final training was for enumerators at the regency/city level. The author conducted this training in each sampled region at the respective regency/city headquarters. For reasons of efficiency, all of this training (of HS enumerators) was scheduled to coincide with the training of Susenas enumerators in each selected region.

Further, in order to maintain the validity and reliability of data, the primary researcher (author of this thesis) maintained full supervision via discussions on a smartphone 'WhatsApp' group and by continuing to monitor the progress of data collection by coordinating with the persons in charge at the regency/city level.

In general, the HS was run simultaneously with the BPS Susenas data collection, i.e. from 1 September to 31 October 2016. During the HS, the author also conducted fieldwork supervision by visiting one CB at random in each regency/city. Illustration of the location of supervision is provided in Figure 3.5. These CBs are also where the focus group discussions (FGDs) were held. Thus, while conducting the FGDs, the author supervised the fieldwork for the household survey.

Figure 3.5. Location of HS's supervisions and FGDs.



Source: Drawn by the author with the help of google maps.

As discussed in Table 3.10, we conducted two FGDs in each of the regency/city of MUBA, OKI, OKUS, Palembang and Lahat.

First, in MUBA, the FGDs were held in Kayuara Ward. This ward is located in Sekayu Sub-District. This ward is around two km away from the MUBA's headquarter. It has an area of around 33 km2 and a population of more than ten thousand people in 2016. This population is distributed in 28 RT (BPS Kabupaten MUBA, 2017a).

Second, in OKI, the FGDs were held in Anyar Village. This village is located in Kayu Agung Sub-District and is around two km away from the headquarter of OKI Regency (BPS Kabupaten OKI, 2017a). This village has an area of around 3.82 km2 and a population of about 1,400 people in 2016 and this population was distributed in four hamlets and eight RT (BPS Kabupaten OKI, 2017a).

Third, in OKUS, the FGDs were held in Bumijaya Village. This village is located in Buay Rawan Sub-District around 15 km from the headquarter of OKUS Regency (BPS Kabupaten OKUS, 2017a). It has an area of around 596 hectares and a population of about 694 people in 2016 and this population is distributed in four hamlets (BPS Kabupaten OKUS, 2017a).

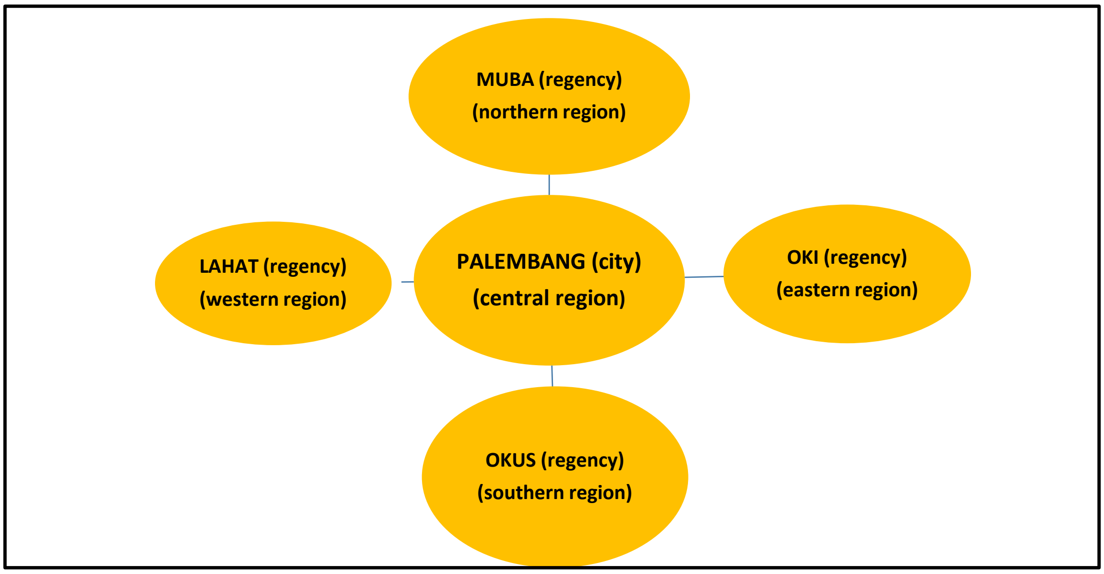
Next, in Palembang, the FGDs were held in 20-Ilir Ward. This ward is in Kemuning Sub-District. It has an area of around 400 hectares and a population of about 15,800 people in 2016, which were distributed in 11 RW and 42 RT (BPS Kota Palembang, 2017a).

Finally, FGDs in Lahat were held in Pagarnegara Village located in Lahat City, around 2.5 km from the headquarter of Lahat Regency (BPS Kabupaten Lahat, 2017a). This village has an area of around 1.23 km2 and a population of about 1,200 people in 2016 (BPS Kabupaten Lahat, 2017a) which was distributed in three hamlets (BPS Kabupaten Lahat, 2017a).

3.5.3 **Background Information about the research area**

Primary data for the present study were collected from only four regencies and one city of South Sumatra, each of which represent the northern, southern, eastern, western and central regions of the province respectively, as shown in Figure 3.6. The expanded forms of the abbreviations of the regencies shown in Figure 3.6 are as follows: MUBA stands for Musi Banyuasin; OKUS stands for Ogan Komering Ulu Selatan; and OKI stands for Ogan Komering Ilir. Lahat and Palembang are the actual names of the regency and the city respectively. Palembang is also the capital of the province.

Figure 3.6. The four regencies and one city representing the northern, southern, eastern, western and central regions of South Sumatra where primary data were collected.



Source: Drawn by the author.

The selected research areas cover a wide variety of geographic, demographic, administrative and economic characteristics of the province of South Sumatra. Table 3.11 provides a summary of those characteristics.

Table 3.11. Geographic, demographic, administrative and economic characteristics of the research areas.

No.	Regency/city	Headquarter	Distance[39] (km)	Area (km^2)	Demographic figures			Government entities (units)			GDP[40]
					People[41]	Density[42]	Sex ratio[43]	Sub-districts	Wards	Villages	
1.	OKI	Kayu Agung	120	17,086.39 (18.54%)	787.51	46.09	105	18	314	13	21.81 (6.46%)
2.	OKUS	Muara Dua	280	4,544.18 (5.20%)	344.09	75.72	110	20	305	7	6.37 (1.89%)
3.	Lahat	Lahat	240	4,297.12 (4.92%)	393.23	91.51	104	22	360	18	13.82 (4.10%)
4.	MUBA	Sekayu	120	14,530.36 (16.62%)	611.44	42.08	105	14	227	13	53.91 (15.97%)
5.	Palembang	Palembang	0	363.68 (0.42%)	1,580.52	4,345.90	100	16	107	0	108.48 (32.14%)

Source: Prepared by the author based on BPS Provinsi Sumatera Selatan (2017b).

3.5.3.1 ***OKI — Ogan Komering Ilir***

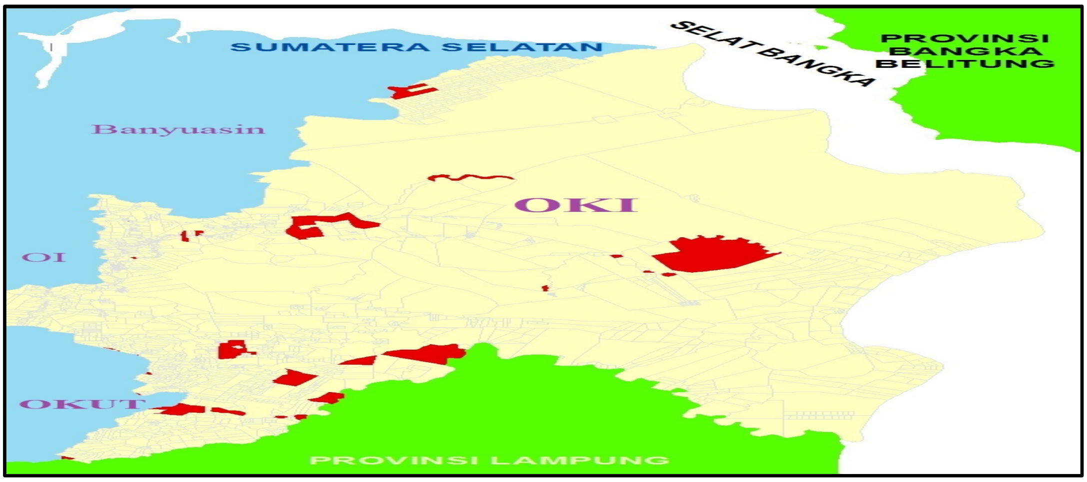
OKI represents the eastern region of the province of South Sumatra (see Figure 3.6). Geographically, OKI is located between 104°20' to 106°00' E; and 2°30' N to 4°15' S (BPS Kabupaten OKI, 2017). This regency has direct borders with other regencies of South Sumatra, i.e. Banyuasin, OI — Ogan Ilir and Palembang in the northern area;

[39] from the Capital City of South Sumatera (Palembang) (km).
[40] refers to GDP - Gross Domestic Products at current prices in 2016 (Rp. 000 billion).
[41] Per June 2015 (000 persons).
[42] person/km^2
[43] male per female.

OI in the western area; OKU and Lampung Province in the southern area, and Bangka Strait in the eastern area (BPS Kabupaten OKI, 2017; see Figure 3.7). The headquarters of this regency, *Kayu Agung*, is located 120 km away (see Table 3.11) from the capital city of South Sumatra (Palembang).

In addition, OKI is the largest regency in South Sumatra. It comprises over 18% of South Sumatra's area (BPS Provinsi Sumatera Selatan, 2017b). This regency has 18 sub-districts (*kecamatan*), 331 villages (*desa*) and 13 wards (*kelurahan*). Of all OKI's sub-districts, Kayuagung has the largest number of villages/wards (25) (BPS Kabupaten OKI 2017). The sub-districts are widely dispersed in this regency. Several sub-districts are close to *Kayu Agung*, but several others are located far away (BPS Kabupaten OKI, 2017). The household survey for this thesis took place in 11 CBs — census blocks located in one urban area and ten rural areas scattered in nine sub-districts of OKI, i.e. *Kayu Agung, Pedamaran Timur, Pampangan, Jejawi, Air Sugihan, Mesuji, Mesuji Makmur, Lubuk Seberuk* and *Lempuing*. The red dots on Figure 3.7 illustrate the locations of the household survey in OKI.

Figure 3.7. Location of household survey in OKI.



Source: Drawn by the author.

Rivers play a significant role in supporting the smoothness of freight transport and passengers in OKI Regency, both between sub-districts and among villages, because 75% of OKI is wetland or swamp (BPS Kabupaten OKI, 2017).

In 2015, the population of OKI was 787,510, with a population density of 46.09 people/km^2 (see Table 3.11). Among the sub-districts, the highest population density is in *SP-Padang* (445 people/km^2), and the lowest in *Tulung Selapan* (8 people/km^2) (BPS Kabupaten OKI, 2017).

In 2016, OKI had a GDP of Rp. 21,810 billion, which contributed 6.46% to South Sumatra's GDP (see Table 3.11.). The leading economic sector in OKI is agriculture, consisting of crops, forestry, livestock, and fisheries (BPS Kabupaten OKI, 2017).

3.5.3.2 ***Lahat***

Lahat regency represents the western region of South Sumatra. It is located between 3.25°–4.15° S; and 102.37°–103.45° E (BPS Kabupaten Lahat, 2017). The headquarters of this regency is *Lahat City*, which is 240 kms away from the provincial capital, Palembang (240 km).

Lahat has an area of 4,297.12 km^2, which comprises 4.92% of South Sumatra's total area. In 2016, this regency had 22 sub-districts, 17 wards, and 360 villages (see Table 3.11). Of the five regencies/city selected in this study, Lahat has the largest number of government administrative entities. The largest sub-district in Lahat Regency is *East Kikim* (564.45 km^2), which accounts for about 13% of the total area of the regency. The smallest sub-district in Lahat Regency is *Muara Payang*, with an area of 37.50 km2 as of 2016, comprising less than 1% of Lahat Regency's total area (BPS Kabupaten Lahat, 2017). *Tanjung Sakti Pumu* is the farthest sub-district (112 km away) from the headquarters of this regency, while the closest sub-district at 7 km away from the headquarters is *Pulau Pinang* (BPS Kabupaten Lahat, 2017).

The household survey for this thesis took place in nine CBs located in two urban areas and seven rural areas scattered in seven sub-districts of *Lahat,* i.e. *Mulak Ulu, Kikim Tengah, Gumay Talang, Lahat, Merapi Timur, Merapi Selatan* and *Pagar Gunung*. The red dots on Figure 3.8 illustrate the locations of household survey in Lahat Regency.

Figure 3.8. Location of household survey in Lahat.

Source: Drawn by the author.

In 2015, the population of Lahat Regency was 393,230 (see Table 3.11), which is unevenly distributed in the regency, with one-third concentrated in *Lahat City* (BPS Kabupaten Lahat, 2017). The uneven distribution of population in this regency is further highlighted by the diversity of population density of the sub-districts. While the overall population density of Lahat regency in 2015 was 91 persons per km^2, *Pseksu* sub-district had the sparsest population distribution with a density of 31.7 persons per km^2 and Lahat sub-district, the densest population with 461 persons per km^2 (BPS Kabupaten Lahat, 2017).

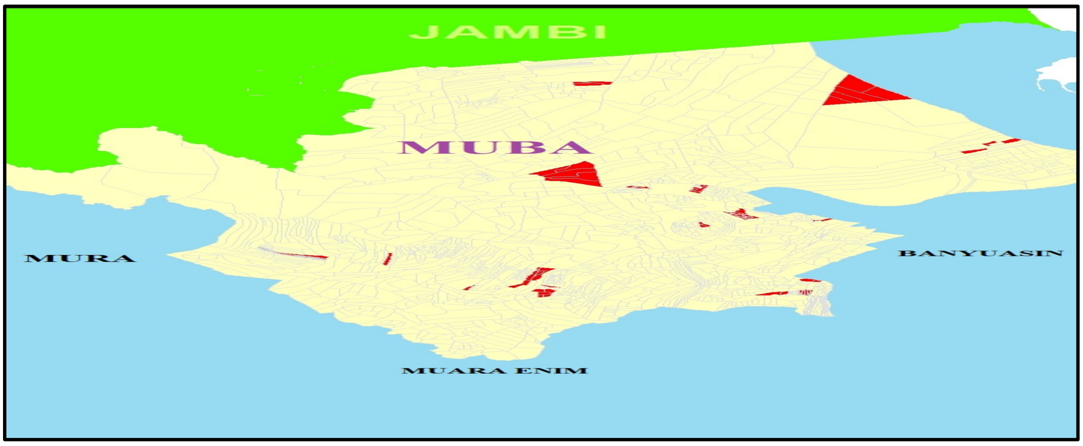
The leading industries in Lahat are mining and quarrying, which in 2016 contributed up to 39% to the GDP of the regency. Although most people of the regency are engaged in agriculture, in 2016 the agricultural sector contributed only 21% of the GDP of the regency. The main agricultural products from Lahat Regency include palm oil, coffee and rubber (BPS Kabupaten Lahat, 2017).

3.5.3.3 ***Musi Banyuasin — MUBA***

Musi Banyuasin or MUBA is located in the northern part of South Sumatra. It lies between 1.3° to 4° South Latitude and from 103° to 104° 45' East Longitude (BPS Kabupaten MUBA, 2017). The headquarters of MUBA is *Sekayu*. The distance of *Sekayu* from Palembang is the same as the distance between *Kayu Agung* and Palembang, i.e, about 120 km (see Table 3.11.).

The population of MUBA in 2015 was 611,440. Its population density as of 2015 was 42.08 persons per km^2, making it the sparsest populated regency among the five regencies/city selected for the present study (Table 3.11). MUBA has an area of more than 14,000 km^2, which comprises about 17% of South Sumatra's area. In 2015, MUBA was divided into 14 sub-districts and 240 villages and wards. The household survey for this thesis took place in nine CBs located in one urban area and eight rural areas in seven scattered sub-districts i.e. *Lawang Wetan, Sekayu, Sungai Lilin, Keluang, Bayung Lencir, Tungkal Jaya* and *Lalan*. The red dots on Figure 3.9 illustrate the locations of household survey in MUBA.

Figure 3.9. Location of household survey in MUBA.



Source: Drawn by the author.

The economy of MUBA makes a significant contribution to the GDP of South Sumatra, With a GDP of Rp. 53,810 billion in 2016, the economy of MUBA accounted for 15.97% of the GDP of South Sumatra (see Table 3.11).

Similar to Lahat, the leading industries of MUBA are mining and quarrying, which together comprise 55.9% of the GDP of MUBA in 2016. The second highest contributor is the Agricultural Sector, which accounted for 14.68% of the GDP of the regency in 2016 (BPS Kabupaten MUBA, 2017).

3.5.3.4 *Ogan Komering Ulu Selatan — OKUS*

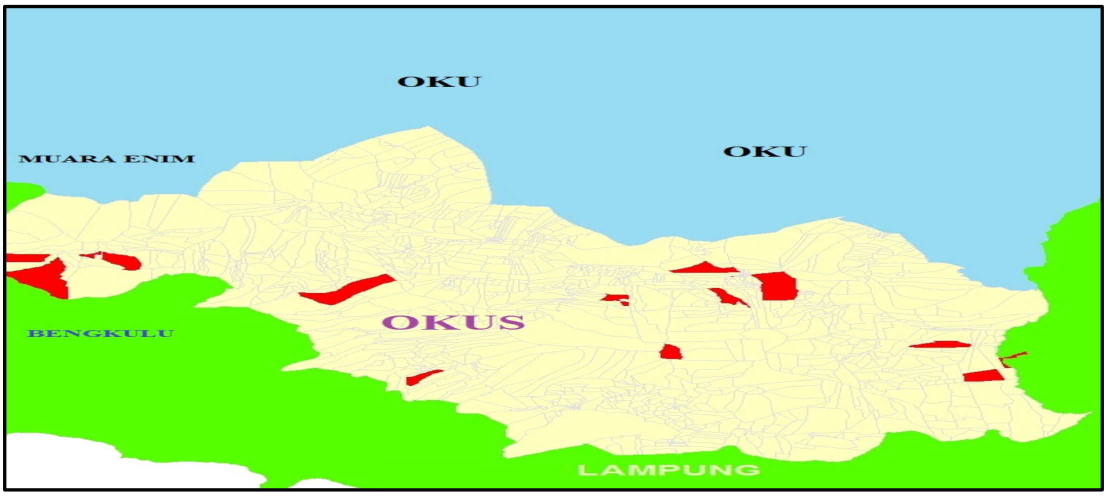
Ogan Komering Ulu Selatan or OKUS is located in the southern part of South Sumatra. It lies between 4°14'–4° 55' S; and from 103° 22'–104° 21' E (BPS Kabupaten OKUS, 2017). Its topography is mostly mountainous with altitudes varying between 45 and 1,643 metres above sea level. Of the five regencies/city included in this study, OKUS can be considered as a newborn, as it was just formally created in 2004 (BPS

Kabupaten OKUS, 2017). The headquarters of OKUS are in *Muara Dua*, which is 280 km away from the provincial capital Palembang. Thus, of the four regencies being studied in the present research OKUS is the farthest area from Palembang.

OKUS has an area of 4,544.18 km^2 (see Table 3.11), 41.94% of which is forest. In 2016, OKUS was divided into 19 sub-districts, 13 of which are located in mountainous areas. The remaining six sub-districts which lie on a flatter plain include M*uara Dua, Buay Rawan, Buay Sandang Aji, Tiga Dihaji, Buay Runjung*, and *Runjung Agung*. The highest point in OKUS Regency is the *Seminung Mount* with an altitude of 1,888 metres above sea level. This mountain is located in *Banding Agung* (BPS Kabupaten OKUS, 2017).

In 2015, OKUS had a population of 344,090, with a population density of 75.72 persons/per km^2 (see Table 3.11). Similar to the other five regencies/city, the population density of OKUS varies between the sub-districts, from 33 persons per km^2 in *Sungai Are* to 177 persons per km^2 in *Muara Dua.* (BPS Kabupaten OKUS, 2017). The household survey for this thesis took place in eight CBs located in one urban area and seven rural areas in six scattered sub-districts of OKUS, i.e. *Mekakau Ilir, Buay Pemaca, Muara Dua, Buay Rawan, Tiga Dihaji* and *Sungai Are*. The red dots on Figure 3.10 illustrate the locations of HS in OKUS.

Figure 3.10. Location of household survey in OKUS.



Source: Drawn by the author.

In 2016, OKUS had a GDP of Rp. 6.37 billion, which contributed 1.9% to South Sumatra's GDP (see Table 3.11). The economy of OKUS is mostly based on the agricultural sector, with coffee being the main produce. In 2016, agriculture contributed 33.64% to the GDP of OKUS (BPS Kabupaten OKUS, 2017).

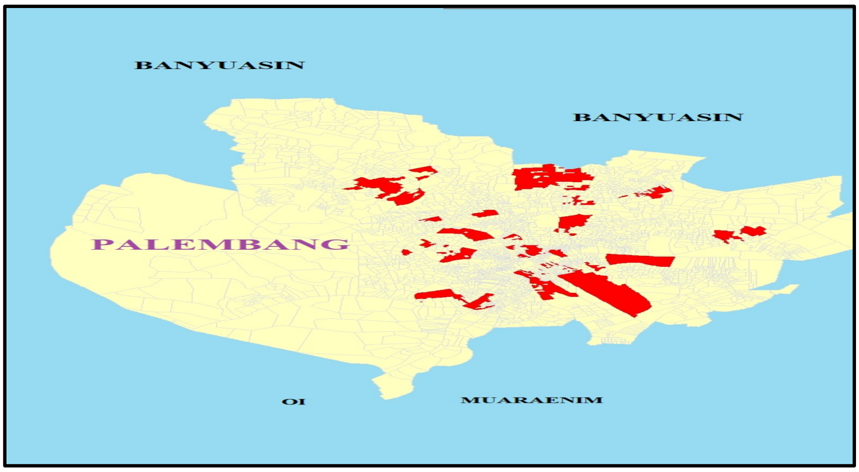
3.5.3.5 *Palembang*

Palembang is the capital city of South Sumatra. It is situated between 2°52'–3°5' S and 104°37'–104°52' E (BPS Kota Palembang, 2017). This city has direct borders with another regency of South Sumatra, i.e. Banyuasin in its northern, eastern and western area; and with Muara Enim and Ogan Ilir in the southern area (BPS Kota Palembang, 2017).

Of all regencies/municipalities in South Sumatra, Palembang has the largest population. In June 2015, Palembang had a population of 1,580,520 (see Table 3.11) spread among 16 sub-districts and 107 wards. The area of Palembang is only 363.68 km^2, which is 0.42% of the total land area of South Sumatra. Thus, Palembang is the densest populated area in South Sumatra, with a density in 2015 of 4,345.95 people/km^2 (see Table 3.11).

The household survey for this thesis took place in 12 CBs located in 11 urban areas and one rural area from the 11 sub-districts of Palembang, i.e. *Sukarami. Ilir Timur I, Alang-Alang Lebar, Kertapati, Kalidoni. Ilir Timur II. Sako, Ilir Barat II, Gandus, Ilir Barat 1* and *Plaju*. The red dots on Figure 3.11 illustrate the locations of HS in Palembang.

Figure 3.11. Location of household survey in Palembang.



Source: Drawn by the author.

In addition, Palembang contributes the most to South Sumatra's GDP. In 2015, Palembang's GDP was Rp. 108,483.64 billion, which is almost one-third (32.14%) of the total GDP of South Sumatra. Palembang's economy is based mostly on the manufacturing sector, which in 2015 comprised 34.69% of Palembang's GDP. The leading manufactured items of Palembang included coal, petroleum refineries, food products and beverages (BPS Kota Palembang, 2017).

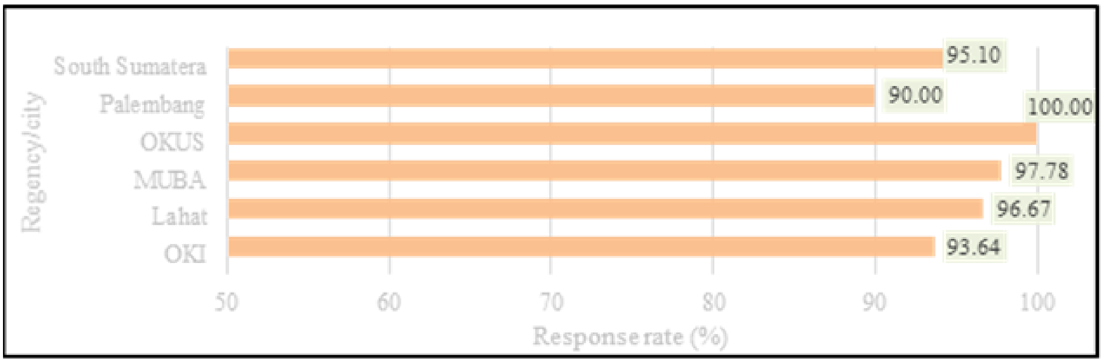
3.5.4 **Response vs. nonresponse**

Response rate refers to the participation rate in data collection. It is measured by dividing the number of responding participants by the total number of the eligible sample. In this research, the eligible sample refers to the number in the targeted sample, which is equal to 490 respondents (see Section 3.4).

Previous studies recommend that the higher the response rate, the better the research (National Research Council, 2013; Rogelberg & Stanton, 2007; Rubin & Babbie, 2017). A large number of nonresponses may induce bias in survey estimates, as such cases may impact on some characteristics of the population which can be under or overrepresented; especially "when a substantial proportion of people in the randomly selected sample choose not to participate in the study" (Rubin & Babbie, 2017, p. 362). Nonresponse errors may occur due to several conditions; such as the interviewers cannot reach the respondents, or the respondents refuse to participate in the survey. As there is no legal obligation for respondents to respond to this research, such respondents may choose to refuse to participate in the study for one reason or another. Thus, it is vital for this research to adopt a strategy which could reduce the presence of nonresponse as much as possible.

The target sample of the HS was 490 households. Of this target sample, 466 households completed the questionnaire. Hence, the completion rate is 466 out of 490, or 95.10%. The completion rate varied between the regencies/city from 90% in Palembang to 100% in OKUS i.e. the lowest completion rate was in Palembang City (90%) (see Figure 3.12).

Figure 3.12. The completed interviews based by regency/city.



Source: Drawn by the author based on household survey from Fieldwork (2016).

This indicates that the interview participation rate was higher in the non-urban region (regencies) than in the urban areas (cities). However, incomplete interviews happened solely because these respondents had moved out of the selected census block when the data collection took place, so the interviewers had no access to approach them for the interview. Such movement out of the selected census block occurred the most in Palembang, the largest urban area in South Sumatra, followed by the towns where population mobility is high (see Chapter 4).

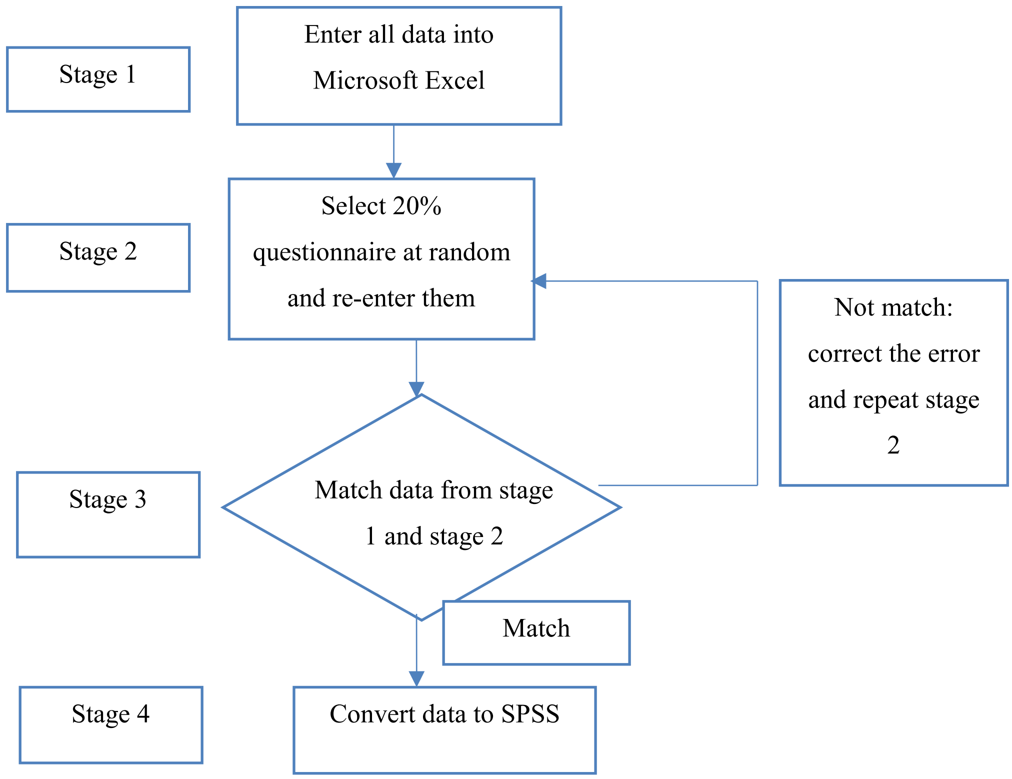
In that case (i.e., when the respondent had moved out of the selected census block), we cannot really call them nonresponses. The households which moved out would simply reduce the target sample size, therefore the nonresponse rate for this study was zero.

3.5.5 **Data screening process**

After the household data were collected, they were entered into the computer in Microsoft Excel (2016), as data in this format can be easily exported to SPSS (Statistical Package for the Social Sciences) (IBM Corp, Released 2017) for analysis.

Recording data with Microsoft Excel (2016) has both benefits and drawbacks. One of the many advantages is that entering the data is not difficult. Microsoft Excel (2016) does not require people to design an entry platform as it can just be typed in: however, entering data directly into Microsoft Excel (2016) has no error verification option. It is easy for human error to creep into data entry, mainly in the form of wrong entries. To minimise such errors and to make sure that the recorded data are accurate, this thesis adopted two stages of control.

Figure 3.13. Stages of data recording.



Source: Drawn by the author.

First, double entry of a sample of questionnaires was done in stages as illustrated in Figure 3.13. At first, data from all the questionnaires were entered into the computer in Microsoft Excel (2016) format. Next, all the recorded questionnaires were separated into five groups at random, then data from the first group of questionnaires were re-entered into the Microsoft Excel (2016) file and compared with data from the same questionnaires entered earlier. If there was any mismatch, the entries were verified from the information contained in the questionnaire and the correct data were entered in the Excel file. This process was continued by re-entering the second group of questionnaires, and so on until all the data were checked and corrected. During the process this thesis achieved full-matched data entry after re-entering three out of five groups of questionnaires mentioned above.

Furthermore, the results of the above data entry are not automatically cleaned. Data can be messy. The second control regarding data quality was done by tabulating the frequencies of the recorded data and then screening the tabulation results. This control aims to identify responses that did not belong in the data. Examples of these include impossible values (that is out of range) or missing values. Although this process is time-consuming, it is necessary to maintain the validity of the quantitative methods, as observed by Osborne (2013). This avoids collecting biased data which may violate statistical assumptions like normality and homoscedasticity (homogeneity of variance) and lead to incorrect estimation of parameters. In this research, these tabulations include:

a) Responded samples by age. This was done to make sure that all respondents were aged 18 years old or above as was requested by the sampling design.

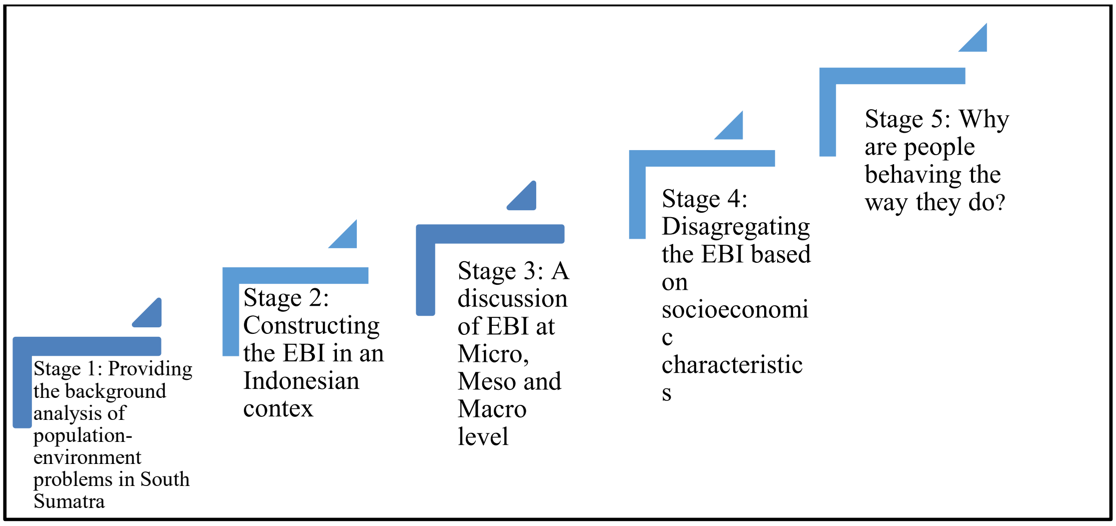
b) Responded samples by sex. This tabulation aimed to make sure that respondents in every CBs were distributed equally or almost equally between males and females.

c) Responded sample based on marital status and their status in the households. This tabulation aimed to match the marital status of the respondents and their relationship within the households. If a dubious condition was found, the researcher went back to the questionnaire and checked whether the recorded data was matched with the information on the questionnaire.

3.6 **Methods of analysis**

In order to answer the research questions this thesis developed a specific procedure for analysing the data in stages, as described in Figure 3.14. The stages range from the analysis of the secondary and primary data, construction of the environmental behaviour index (EBI), the analysis of the overall EBI at macro-, meso- and micro- and levels as well as the analysis of EBI in terms of the socioeconomic characteristic of the respondents. Furthermore, this thesis also provides an analysis of qualitative data which aims to provide an understanding of why certain people behave or act with the environment the way they do based on the theory of planned behaviour (Ajzen, 1991). Figure 3.14 describes the step by step process of data analysis and the subsequent discussion explains this in detail.

Figure 3.14. Stages of data analysis.



Source: Drawn by the author.

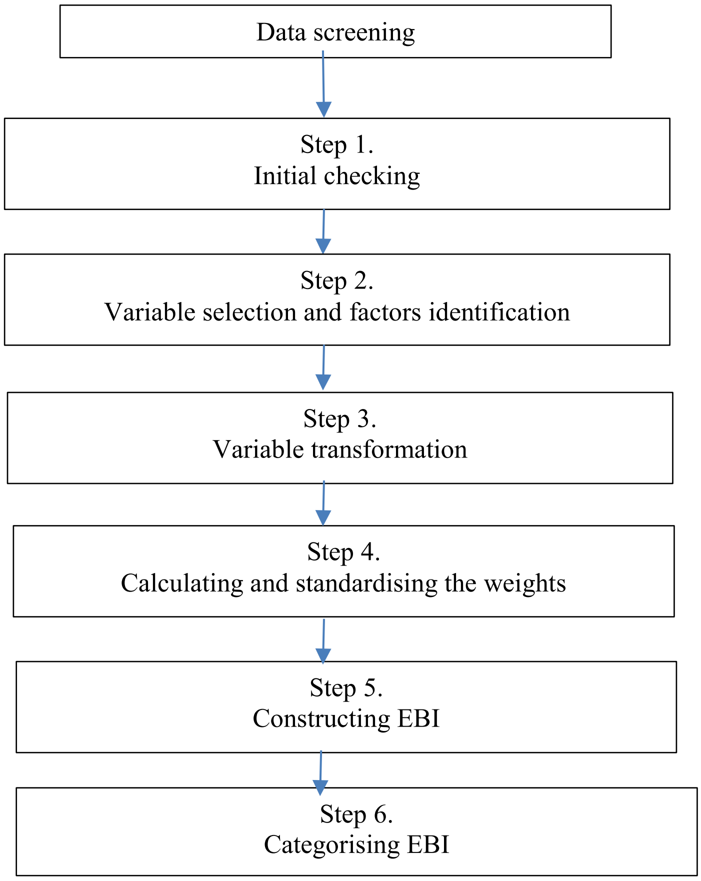
3.6.1 **Stage 1: Providing the background of population-environment problems in South Sumatra**

To familiarise the readers with the population-environment problems in South Sumatra, this thesis provides an analysis from the secondary data, obtained from the BPS, the Indonesian Ministry of Environment and Forestry, the Regional Development Planning Board of South Sumatra and the Indonesian National Board for Disaster Management.

3.6.2 **Stage 2: Constructing EBI**

The construction of the EBI involves a step by step procedure. This procedure starts from Step 1 (initial checking) and ends in Step 6 (categorising EBI). This based on stages of formation of a composite indicator recommended by the Organisation for Economic Co-operation and Development or OECD (OECD, 2008a). Based on the OECD (2008a) this research took several procedures to construct EBI as described in Figure 3.15.

Figure 3.15. Procedure to measure the EBI.



Source: Drawn by the author.

Step 1 aims to do the initial checking. This process involves checking whether our sample size is adequate[44] to the statistical model of the EBI. However, before Step 1 was conducted, an initial checking searched for the presence of missing values within the variables.

Furthermore, to make it easier to interpret the EBI results, Step 1 also attempted to ensure that all the variables go in the same direction, meaning, the higher the score, the more positive the value that it holds: here more positive indicates a relatively more friendly EB. As such, all the variables presenting with a negative scaling score system were transformed into positive ones so that all variables have a score that goes in the same direction. That is, the higher the score, the friendlier the behaviour indicated.

Other than transforming negative scoring scale variables to positive ones, variables within the housing dimension were also similarly transformed. This was done because

[44] According to Tabachnick and Fidell (2013) an adequate sample size is of primary concern when designing a study.

variables in the housing dimension have yes/no responses (on a scale of two). Such two scale variables were converted into new five scale variables. In detail, the process of variable transformation is illustrated in Table 3.12 and discussed in detail in Chapter 5.

Table 3.12. The process of transforming the negative scoring scale variables.

Dimension	Code of variable	Scale category	Variable transformation
Food	A1, A2, A8	Positive	No transformation
	A3, A4, A5, A6, A7	Negative	Reversing the Likert score [45]
Water	A10–A12	Positive	No transformation
Energy	A13, A15–A16	Positive	No transformation
	A14	Negative	Reversing the Likert score [72]
Transport	A17–A21	Positive	No transformation
Waste disposal	A23, A24	Positive	No transformation
	A22, A25, A26	Negative	Reversing the Likert score [72]
Housing	A27, A28, A29, A30	Negative	Reversing the Likert score & re-scaling[46]

Source: Prepared by the author.

Step 2 aims to reduce an initially large set of variables to a smaller set that still contains most of the information in the large set. This stage includes the process of selecting a more concise set of variables and re-grouping those selected variables into several factors forming EB. This process is done using a statistical procedure known as factor analysis (A. P. Field, 2009; Hair, 2006; Stevens, 1995; Tabachnick & Fidell, 2013). According to OECD (2008a), multivariate statistical analysis could provide useful techniques in exploring the appropriateness of a dataset during the development of a composite indicator. Such techniques include the process of variable weighting and of aggregation of variables to form a composite measure, as well as an understanding of the implications of the subsequent methodological choices. One of the multivariate analysis suggested by OECD for this purpose is factor analysis (OECD, 2008a, p. 26). The adoption of factor analysis has several advantages, including the ability to compress a broad set of variables, but retain the maximum possible proportion of the total variation in the datasets (OECD, 2008a, p. 26).

Factor analysis is an interdependence technique whose primary purpose is to explain the structure underlying a variable in the study. Factor analysis aims to reduce variables or to create an overview of data by grouping variables by observing the

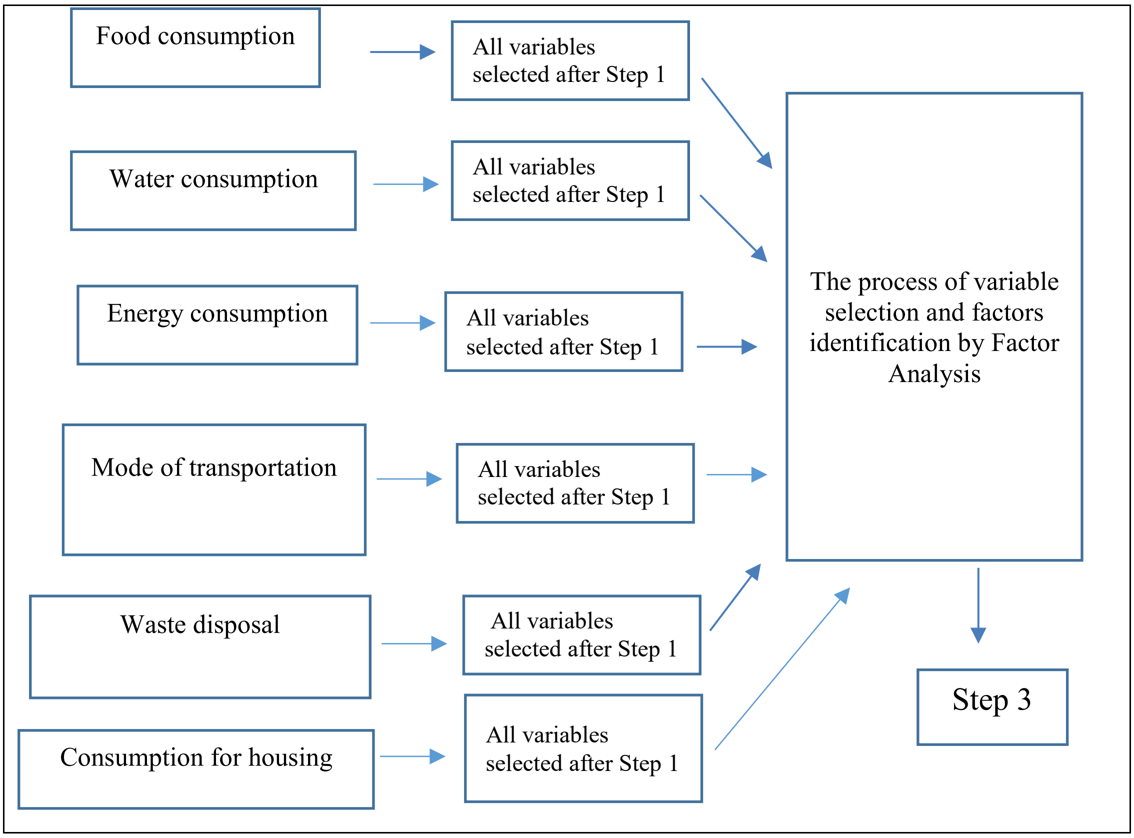
[45] 1 to 5, 2 to 4, 3 to 3, 4 to 2, 5 to 1.
[46] 1 to 5, 2 to 1.

interrelations between the selected variables and explaining the relationships among the variables by arranging them into several variable factor groups. In factor analysis, every variable is grouped by looking at their correlation so that variables that have a strong correlation to each other will be grouped together (A. P. Field, 2009; Hair, 2006; Stevens, 1995). According to Pallant (2016), factor analysis has been used extensively by researchers involved in the development of scales.

Several software applications are available for factor analysis and this research used IBM—SPSS software Version 25 (IBM Corp, Released 2017). However, before running the factor analysis software, data screening was required to make sure that the data sets are suitable for factor analysis. During this process, all 30 variables of environmental behaviour collected as primary data through the household interviews were screened for missing values.

The process of variable selections explained in Step 2 (see Figure 3.16) was achieved by running factor analysis with several consecutive iterations. These iterations were also sequential. In every iteration, each variable is checked one by one by considering eight well-recognised criteria. These eights criteria include: Pearson Correlation (minimum 0.3 and less than 0.9), determinant (different from 0), KMO — The Kaiser-Meyer-Olkin measure of sampling adequacy, Bartlett Test, Kaiser Criterion, variance explain by factors, scree-test and parallel analysis (A. P. Field, 2009; Franklin, Gibson, Robertson, Pohlmann, & Fralish, 1995; Hair, 2006; Stevens, 1995; Tabachnick & Fidell, 2013). When in an iteration, one of the eight criteria mentioned above was not fulfilled, this research proceed to the next iteration. A detailed process about variable selection and factors identification is discussed in Chapter 5.

Figure 3.16. Step 2: The process of variable selection and factors identification by factor analysis.



Source: Drawn by the author.

After reducing the number of variables by factor analysis, the next step (Step 3), was to categorise the respondents according to whether they have been displaying environmentally friendly or unfriendly behaviour with respect to a given variable. At the same time, the score of a selected variable was converted to 0 or 1, where a score of 0 means unfriendly, behaviour and a score of 1 means friendly behaviour. The transformation was done by considering whether a subsequent variable has a positive or a negative Likert scale category. The details about this process are explained in Chapter 5.

Step 4. Counting the weighting score

The next stage was measuring the 'weight' of each variable for constructing the EBI. Each variable was given a weight by adopting the method of weight calculation used in the study of measuring social capital in Indonesia in 2009 (BPS, 2010d). According to BPS (2010) the weight of each variable in a dimension is derived from the optimal numbers of factors resulting from the factor analysis. Based on this the weight of each variable was calculated by considering the structure of the dimensions formed during

Step 2 above. This was done by multiplying the value of the loading factor of a variable and the variance of this variable's corresponding dimension. These statistics can be found from a matrix on the SPSS factor analysis output on the final iteration of Step 2, called the pattern matrix[47]. Adopting this method, this research calculated two types of a variable's weight, i.e. the unstandardised weight (equation 1) and the standardised weight (equation 2).

a. $\boldsymbol{W_u = \frac{LF}{\sum LF}\ x\ RSSL}$ ……………………………..…………………equation 1,

where:

$\mathrm{W_u}$ = unstandardised weight

LF = factor loading on pattern matrix

$\sum$ LF = sum of the factor loadings of all variables in a dimension

RSSL = extraction sums of squared loadings (% of variance) of the related dimension.

b. $\mathbf{W} = \frac{\boldsymbol{W_u}}{\sum \boldsymbol{W_u}}$ …………………………………………………………equation 2

Note:

W = standardised weight

$\mathrm{W_u}$ = unstandardised weight

The standardised weight is calculated to help interpret the variable so that the interpretation is easier. The value within the standardised weight describes the contribution of each variable to the formation of the EBI (assuming that every other variable is constant).

Step 5. Index formation

The next stage is calculating the EBI. The EBI is the sum of the scores formed in Stage 2, multiplying it by the weight obtained in Stage 3 and expressing it as a percentage. Thus, the value of EBI lies between 0 and 100. In this study, the EBI is calculated at three levels, micro level (i.e., household or respondent level), meso level (i.e., at the

[47] Pattern matrix is a matrix in factor analysis containing the regression coefficient for each variable on each factor in the dataset (A. P. Field, 2009, p. 791)

level of each dimension used in this study) and macro level (i.e., at the level of the average of all the dimensions used in this study).

The formula for the EBI at micro level is described in equation 3, and for meso level in equation 4 and 5. Next, the formula for the EBI at macro level is described in equation 6.

a) $EBI_i = \mathbf{100 \times \sum_{j=1}^{m} W_j X_{ij}}$ ………………………………… equation 3.

b) $EBI_j = 100 \times \frac{W_j \sum_{i=1}^{n} X_{ij}}{W_j}$ ………………………………… equation 4.

c) $EBI_k = 100 \times \frac{\sum_{i=1}^{n} \sum_{j=1}^{l} W_{jk} X_{ij}}{\sum_{j=1}^{l} W_j k}$ ………………………… equation 5.

d) $EBI = 100 \times \frac{\sum_{i=1}^{n} \sum_{j=1}^{m} W_j X_{ij}}{n}$ ………………………… equation 6.

Notes:

EBI = environmental behaviour index at macro level, $0 \leq EBI \leq 100$.

EBI_i = environmental behaviour index at micro level, $0 \leq EBI_i \leq 100$.

EBI_k = environmental behaviour index at meso level (dimension), $0 \leq EBI_k \leq 100$.

EBI_j = environmental behaviour index at meso level (variable), $0 \leq EBI_j \leq 100$.

W_j = standardise weight variable j, $\sum_{j=1}^{k} W_j = 1$

X_{ij} = score variable j for respondent i.

i = respondent number i, i= 1,2, …, n.

n = number of respondents.

j = variable j, j = 1,2, …, m.

m = number of variables approved by factor analysis.

k = dimension k, k = 1, 2,.., o.

o = number of dimensions approved by factor analysis o < m.

l = number of variables in each dimension approved by factor analysis, $\sum l = m$.

Step 6. Categorisation of the index for further analysis.

To help interpret the EBI, this research proposes a limit, i.e. the friendliness line. This line is a cut-off point that can be used to consider the level of friendliness of any given EBI. The friendliness line is proposed by adopting the two-thirds rule introduced by Alkire and Foster (2011). According to this rule, a person is considered as friendly in any particular dimension if he/she performs an EBI for a minimum of two-thirds of the maximum point.

As mentioned earlier, the value of EBI has been set to range of 0 to 100, and an EBI value of two-thirds on this scale indicates an environmentally friendly behaviour. As 66.67 is equal to two-thirds of 100 this means, if an EBI has a value below 66.67, then this indicates environmentally unfriendly behaviour. Conversely, if the EBI has a value equal to 66.67 or more, then it can be categorised as indicating environmentally friendly behaviour. In simple words, the categorisation of this friendly vs. unfriendly behaviour is based on the friendliness line as illustrated in Table 3.13.

Table 3.13. The friendliness line.

Category	EBI
1. Friendly	EBI $\geq$ 66.67
2. Unfriendly	EBI < 66.67

Source: Prepared by the author.

Further analysis of EBI can be done using the friendliness line. Such analysis includes a discussion about headcount ratio analysis as well as about the level of friendliness of the respondents and their degree of severity in environmentally unfriendly behaviour. The indicator of headcount ratio ($F_{1,2}$), refers to the proportion of a group of respondents located below the friendliness line and their counterpart. The first group is called the environmentally not-friendly people (EnFP) and the second is the environmentally friendly people (EFP). The unfriendliness gap (F_3) indicator refers to the gap between the EBI of the unfriendly people and the friendliness line. The severity of environmentally unfriendliness (S) measures the variance among the gap, which indicates the extent to which respondents fall below the friendliness line. The higher the value of F_3 and S the worse the condition of the EB. In detail, the formulas to measure those three indicators are described in equation 7, equation 8, equation 9 and equation 10 below:

a. Measuring the Proportion of the sample that is friendly or unfriendly.

$F_{1\,(\text{friendly})} = \frac{\mathbf{n}_{\text{friendly}}}{\mathbf{n}} \text{x } 100\%$ ……………………… ………..…… equation 7.

$F_{2\,(\text{unfriendly})} = \frac{\text{n}_{\text{unfriendly}}}{\text{n}} \text{x } 100\%$ ………………………………… equation 8.

Notes:

$F_{1\ (friendly)}$ = proportion of the environmentally friendly respondents.

$F_{2\ (unfriendly)}$ = proportion of the environmentally non-friendly respondents.

$n_{Friendly}$ = number of the environmentally friendly respondents (EBI ≥ 66.67).

$n_{unfriendly}$ = number of the environmentally non-friendly respondents (EBI < 66.67).

n = total sample.

b. The gap and the severity among the environmentally unfriendly people

$$F_3 = \frac{1}{n}\sum_{i=1}^{n}\frac{G_{\text{unfriendly i}}}{\text{friendliness line}} \quad \text{…………………………………..……… equation 9.}$$

$$S = \frac{1}{n}\sum_{i=1}^{n} = \sum_{i=1}^{n}\left(\frac{G_{\text{unfriendly i}}}{\text{friendliness line}}\right)^2 \quad \text{……………………………… equation 10.}$$

Notes:

$G_{\text{unfriendly i}}$ = (friendliness line − EBI i) *I* (EBI i < friendliness line).

Friendliness line = 66.67.

i = respondent number i.

n = sample size.

F_3 = the unfriendliness gap.

S = the severity of environmentally unfriendliness.

3.6.3 **Stage 3: A discussion of EBI at micro, meso and macro levels**

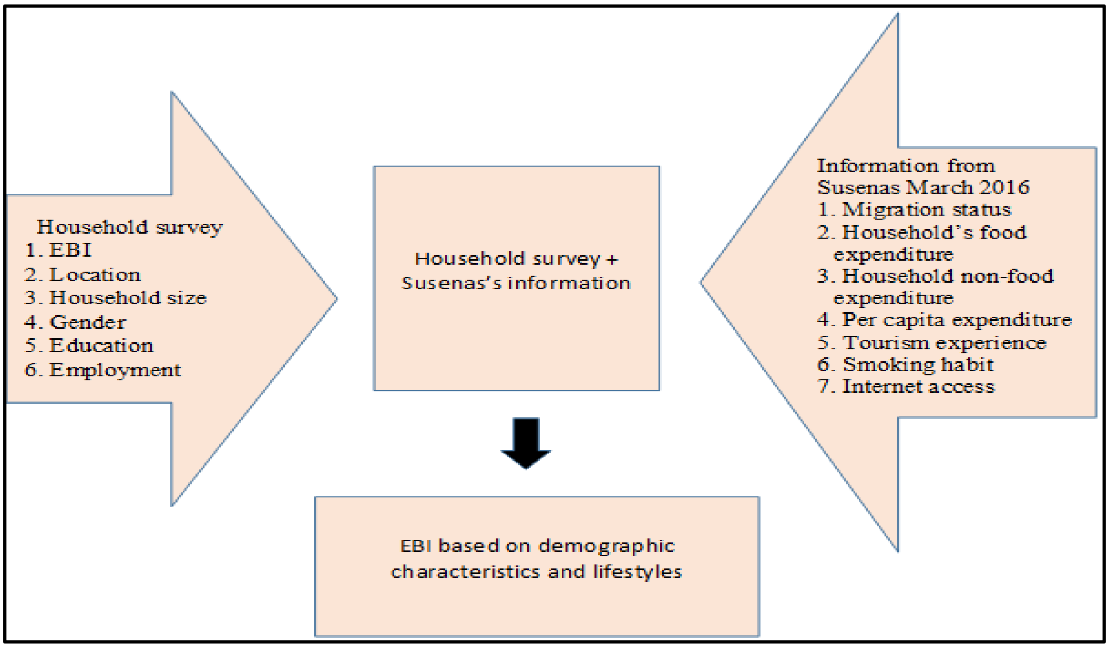
This thesis constructed EBI at three scales, micro, macro and meso, as discussed in Step 6 (index formation) of Stage 2. Chapter 6 provides the analysis of the results.

3.6.4 **Stage 4: What distinguishes the environmentally friendly people of South Sumatra from those who are environmentally not friendly?**

The EBI resulting from this study is an aggregation index, showing significant disparities present among regions, between the sexes, between urban-rural, among age, etc. Since the EBI came from a consolidation of various socioeconomic groups, it may cover substantial variations across socioeconomic status. Thus, operationalizing EBI requires some analysis of the socioeconomic distribution of EBI itself.

As a consequence, this research also analysed EBI based on different socioeconomic characteristics. This was done by identifying groups of people based on their degree of environment-friendly behaviour. This analysis is necessary to provide us with a detailed picture of any group of the population that face a higher risk of environmentally unfriendly behaviour. To help address this, this research disaggregates the EBI based on the demographic and lifestyle characteristics of the respondents. The demographic variables comprise household size, age, location, sex, employment, education and migration; while lifestyle variables include, per capita expenditure, household's food expenditure and non-food expenditure, tourism activities, smoking activities and access to the internet.

Figure 3.17. Analysis in Stage 2.



Source: Drawn by the author.

To do this, this research merged the information gathered from the household survey and the secondary data, i.e. Susenas. This merging process needs to be done because this research wants to use the rich socioeconomic characteristics of the respondents available in Susenas. After the data was merged, using SPSS, the united data was run again to explore the EBI based on the socioeconomic characteristics of the respondents. Figure 3.17 describes the analysis process used at this stage, while detailed information about the procedure and the results of the analysis are discussed in Chapter 7.

3.6.5 **Stage 5: Analysis of qualitative data: Thematic analysis**

Qualitative data for this research were collected through the use of focus groups in each of the five regencies/city. These discussions were audio-recorded by the author with the permission of the focus group participants. These recorded files were then transferred into NVivo Software 11 for Windows (Bazeley, 2013). NVivo is a software program consisting of a set of tools to support a researcher in organising, analysing and visualising the qualitative data (Bazeley, 2013, pp. 2–3).

Qualitative information collected in this study through FGDs was analysed with respect to the main themes emerging out of the FGDs. According to Fereday and Muir-Cochrane (2006, p. 82) thematic analysis involves searching for themes that appear important in understanding the problem being researched and that are deemed important by the researchers, to form a comprehensive picture of the problem. Furthermore, Braun and Clarke (2006, pp. 77–78) state that the starting point of finding the themes could be "inductive" or "data-driven", i.e., emerging from the data.

In conducting the thematic analysis, the following procedures have been adopted from Braun and Clarke (2006):

First, in order to familiarise with the depth and the content of the information gathered through FGDs, the responses from the FGD participants were transcribed by the author of this thesis and the transcriptions were read back several times by the author. During the reading, the author took notes to get the general ideas and to identify information that was deemed important.

Second, the author generated the initial codes of the FGD data by using Nvivo software (Bazeley, 2013). Following the theory of planned behaviour (Ajzen, 1991) discussed in Chapter 2, the author put the emphasis on coding every conversation expressing the notion of attitudes, subjective norms and barriers in the adoption of environmental behaviour.

Third, the author developed the initial themes and sub-themes from the coded data by using parent and child nodes in NVivo. The terms of parent and child in Nvivo's nodes refer to the hierarchies of the nodes, where child nodes are sub-nodes under a parent node (Bazeley, 2013).

Next, the author reviewed the themes gathered in the third step mentioned above. The review was done by deleting unimportant themes, merging any similar or allied themes or developing important themes which were not yet recognized.

Lastly, by incorporating the theory of planned behavior, the linkage among the themes emerging from the previous steps are discussed. The results of this qualitative analysis are presented in Chapter 8.

3.7 **Summary**

This chapter describes the research design, the process of sampling and data collection. In addition, this chapter also discusses the methods for data analysis. To achieve its objectives, this study collects information both from primary and secondary sources. The major source of the secondary data is the BPS — the Indonesian Statistics Agency.

The HS is used mostly to collect environmental behaviour indicators. Given that the definition of environmental behaviour is multidimensional, the environmental behaviour indicators are derived from multidimensional variables. These variables symbolise six dimensions of consumption and wasting activities in Indonesia i.e., food consumption, water consumption, energy consumption, transportation consumption, housing consumption, and waste disposal. Furthermore, the survey also compiled the demographic information of the respondents and their definition on the concept of environmentally friendly behaviour — EFB.

The HS interviewed a set of respondents in a sub-sample of South Sumatra's Susenas respondents. These samples were taken from five regencies/city from geographically dispersed areas in South Sumatra, representing the eastern, western, northern, southern or centre of the province. In addition to HS, ten focus groups were held in the five selected regions mentioned above. Focus groups were used to help this research shed light on the experiences of individuals which could reflect the attitudes, norms and specific barriers in relation to efforts to foster EFB. As such, the results of the focus group discussions act as a complement to the results of the household data collection.

Table 3.14. Summary of the methods.

No	Objectives	Data input	Data source	Methods of analysis
1	Gathering information about people's environmental behaviour with respect to key consumption items and waste disposal to support their lifestyle in South Sumatra	data related to the population-environment problems in South Sumatra	Secondary data related to the population-environment problems in South Sumatra (from BPS, Ministry of Environment and Forestry, The Regional Development Planning Board of South Sumatra, and other relevant sources). Primary Data (HS and FGDs)	Descriptive analysis
2	Gathering information about the demographic and lifestyle characteristics of the representatives of the selected sample of households surveyed in South Sumatra	-	a. Primary data: information on demographics of respondents from the HS b. Information on demographic respondents and their lifestyles from Susenas (March 2016 Data)	-
3.	Developing an environmental behaviour index (EBI)	30 behavioural variables	Results from objective 1 (HS)	Factor analysis and the two-thirds rule
4	Developing a benchmark to distinguish the environmentally friendly group and the not-friendly group.	EBI	Results from objective 3	Adoption the two-thirds rule
5.	To examine the relationship of EBI with demographic and lifestyle factors in South Sumatra?	EBI based on socioeconomic characteristics	a. Results from objective 3 b. Results from objective 4 c. Results from objective 5	Decomposition analysis
6.	To understand the reasons behind the adoption or the non-adoption of environmentally friendly behaviour (EFB) in South Sumatra	The narratives of attitude, subjective norms and perceived behavioural control related to EB	Primary data (qualitative data from HS and FGDs)	Thematic analysis

Source: Prepared by the author.

Several procedures are used to analyse the data to address the research questions and a summary of the adopted methods is provided in Table 3.14. Next chapters will outline and discuss the findings of this thesis.

CHAPTER: 4 SOUTH SUMATRA: A SIGNIFICANT POPULATION AND ENVIRONMENT PROBLEMS

4.1 Introduction

This chapter explores the significant of population and environment problems in South Sumatra using secondary data. The discussion within this chapter is supported by secondary data collected by Statistics Indonesia — *Badan Pusat Statistik* (BPS), Ministry of Environment and Forestry (*Kementrian Lingkungan Hidup dan Kehutanan* — KLH), Bappeda — The Regional Development Planning Board of South Sumatra and other similar sources. Secondary data from BPS include series data from the population census[48], the SUPAS — the intercensal population census, Susenas, the village potential census and other surveys of the BPS, while data from KLH, Bappeda and any other agencies include their official statistics and published reports.

The findings of this chapter serve as a background information of why the adoption environmentally friendly behaviour is important for South Sumatra from a demographic perspective. The relationship between population and environment has been a matter of great interest for a very long time with the publication of the essays on population by Malthus in the late 18th century and periodically discussed in the following decades, interest in this relationship was started to be taken up seriously only after the 1960s (Sherbinin, Carr, Cassels, & Jiang, 2007). Based on an extensive review of the literature, Sherbinin et al. (2007, pp. 346-347) conclude that the relationship is rather complex and identified three basic issues in these relationships, namely that "(i) specific population changes (in density, composition, or numbers) relate to specific changes in the environment (such as deforestation, climate change, or ambient concentrations of air and water pollutants), (ii) changes in environmental conditions, in turn, affect population dynamics, and (iii) intervening variables, such as institutions or markets, mediate the relationship". In light of these posited relationships, this thesis aims to provide the background information on the population situation of South

[48] Census have been held in Indonesia since 1961, however since 1980 the census was undertaken every ten years at a year ending in zero. In-between these two extra census were held in years ending in five and BPS hold the Intercensal Population Census or SUPAS. During the writing of this thesis, the latest population census in Indonesia was in 2010, whereas the latest SUPAS was in 2015.

Sumatra as a part of the first issue mentioned above and investigate people's environmental behaviour as a mediating factor as a part of the third issue.

To achieve the above objective, this chapter is divided into five sections. Section 4.1 is introduction and followed by an exploration on South Sumatra's geographic condition in brief in Section 4.2. Section 4.3 discusses population problems in South Sumatra and explores how the problems contribute to environmental deterioration. Next, Section 4.4 reviews the state of South Sumatra's forest, water, and municipal solid waste in the region. Section 4.5 is the summary.

4.2 **South Sumatra in brief**

South Sumatra is one of the oldest provinces in Indonesia. After Indonesia gained its independence in 1945, the Indonesian Government declared this region to be part of Sumatra Province (PP No.8, 1947)[49]. Several years later, South Sumatra received its autonomy and was established as a province in 1948 (UU No.10, 1948; UU No.25, 1959)[50]. During the period 1948 to1959 South Sumatra Province had a much larger territorial area than it is today. Previously South Sumatra also covered several provinces that were ultimately given autonomy, i.e. Lampung (UU No.14, 1964), Bengkulu (UU No.9, 1967), and lastly, the islands of Bangka Belitung (UU No.27, 2000).

Figure 4.1. Map of South Sumatra.

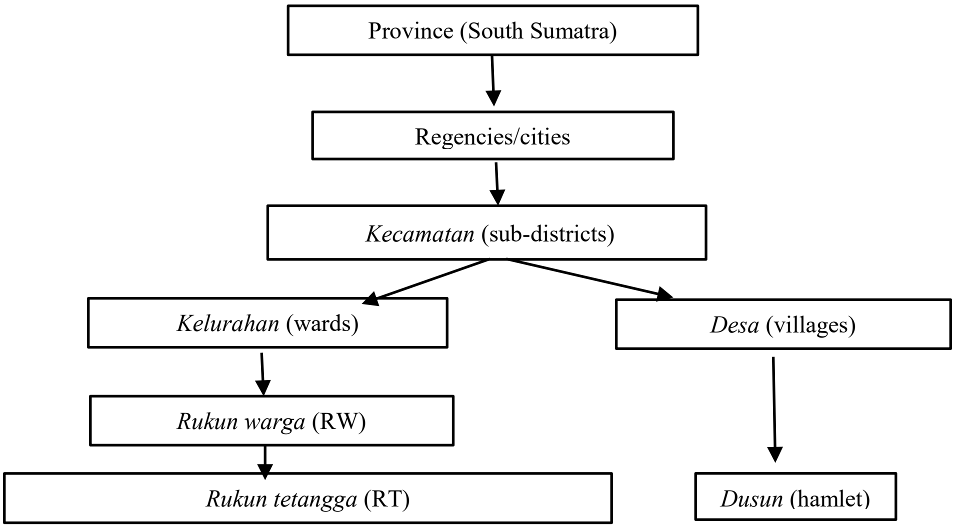
Source: Google (2018b).

[49] PP is the abbreviation for Peraturan Pemerintah or a government regulation.
[50] UU is the abbreviation for Undang-Undang or law.

Geographically, the current South Sumatra lies between 1–4°S and 102–106°E (BPS Provinsi Sumatera Selatan, 2017c). This province, with Palembang as the capital city, has direct borders with four provinces of Indonesia, i.e. Jambi in the north, Lampung in the south, Bengkulu in the west; and Bangka Belitung in the east (see Figure 4.1).

South Sumatra's land area is more than 87,000[51] km^2 spreading into 17 regencies/cities (BPS Provinsi Sumatera Selatan, 2017c). Approximately half (50.6%) of South Sumatra's area is within three regencies, i.e. Ogan Komering Ilir (OKI), Musi Banyuasin (MUBA) and Banyuasin, while the rest of the total area is scattered over 14 other regencies/cities (BPS Provinsi Sumatera Selatan, 2017c; 2018c, p. 9). Palembang, the capital city of South Sumatra, has the smallest land area of 364 km^2 (BPS Provinsi Sumatera Selatan, 2018c, p. 9).

Figure 4.2. The administrative divisions in South Sumatra.



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2017c, p. 23).

Like most provinces in Indonesia, South Sumatra's governments are arranged into several different levels of government entities, with the provincial government at the top of the hierarchical structure (see Figure 4.2). The highest executive leader at the provincial level is the Governor. Next, below the provincial government is the regencies/cities (see Figure 4.2), with regent/mayor as the highest executive leader.

[51] Several government agencies reported different values for the total area of South Sumatra. Sources from BPS-Statistics South Sumatra consistently cited in its year book that the total area is 87,421.24 km^2 (BPS Provinsi Sumatera Selatan, 2017c, p. 9; 2018c, p. 9), however, BPS-Statistics Indonesia cited South Sumatra's total area as 91,592.43km2 (BPS, 2017c, p. 9). Another agency, Bappeda Provinsi Sumatera Selatan (2012, p. 4) stated 91,806.36 km^2. For the purpose of analysis consistency, this chapter uses South Sumatra's area based on BPS Provinsi Sumatera Selatan (2017b); (BPS Provinsi Sumatera Selatan, 2018c), because most data quoted in this chapter is also based on BPS Provinsi Sumatera Selatan (2017c); (BPS Provinsi Sumatera Selatan, 2018c).

Since the enactment of law number 22 in 2007[52] on the regional general election, South Sumatra's residents have elected their governor, regent or mayor once every five years during a democratic general election[53]. Both regencies and cities have the same autonomous level, however compared to a city, a regency has a wider area which includes urban and rural areas, while a city mostly covers urban areas (see Tikson, 2008).

The government entities below the regency/city are the sub-districts (*kecamatan*). The number of *kecamatan* in each regency/city varies according to the size of the regency/city. The *kecamatan* is then divided into several villages and *kelurahan* (wards)[54]: villages refer to government entities under *kecamatan* located in rural areas, while *kelurahan* are in urban areas. In 2016, South Sumatra had 232 *kecamatan,* 2,859 villages and 377 wards (BPS Provinsi Sumatera Selatan, 2017c, p. 23).

After the villages, the next government entities are the hamlet or *dusun*; which is the lowest government entity in South Sumatra's rural areas. Whereas in urban areas, the *kelurahan* is divided into several RW — *Rukun Warga,* which can be translated into English as a neighbourhood association (Hun, 2002, p. 9). Next, each RW is divided into several RT — *Rukun Tetangga* also translated as a neighbourhood association but smaller than RW, which is the lowest government entity in South Sumatra's urban areas. In Palembang for example, according to (Perda Kota Palembang No.3, 2017)[55] RT is defined as a neighbourhood association that include 100–200 families. While RW is a neighbourhood association of 10–20 RT.

4.3 The population of South Sumatra and their environmental challenges

This section discusses the trends in population dynamics in South Sumatra including the population size, causes of growth and distribution in relation to location, age, sex,

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[52] See UU No.22 (2007).

[53] When this thesis conducted its primary data collection in 2016, the Governor of South Sumatra was Alex Noerdin, who governed the province for two consecutive periods, i.e., 2008-2013 and 2013-2018 (Nasrulhak, 2018). After Alex Noerdin stepped down from this position he was replaced by Herman Deru who won the Governor's election on July 2018 (Tamtomo, 2018). Herman Deru officially started his duties as the Governor of South Sumatra on October 1, 2018, and will govern South Sumatra in the period 2018-2023 (Ihsanuddin, 2018).

[54] A village has rural connotations compared to a ward which is more urbanised. Furthermore, a rural village is headed by *'kepala desa'* or the head of the village, who is selected from among the residents by popular vote. A ward or kelurahan is headed by a '*lurah*', who is an appointed civil servant by the directly elected a regency/city's head (Banerjee, Hanna, Kyle, Olken, & Sumarto, 2018).

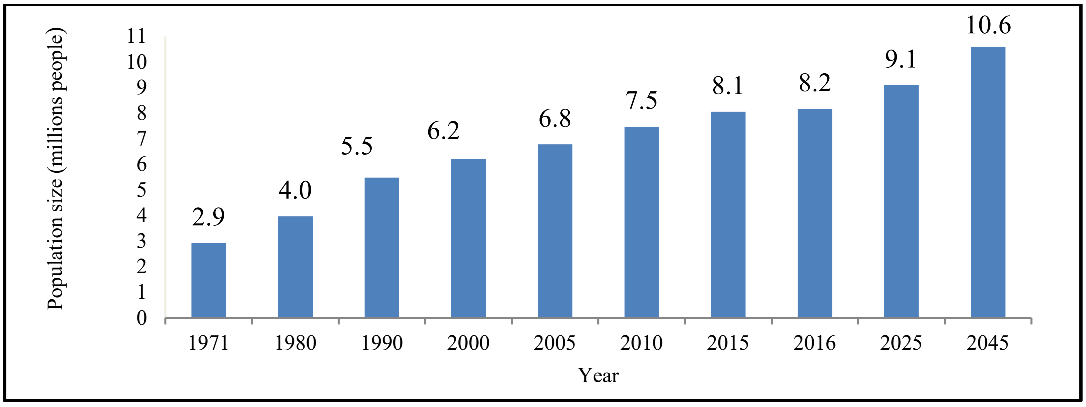
[55] Perda is the abbreviation for *peraturan daerah* or local government rule.

education, and occupation. Following the discussion, further implications of these demographic trends for the environment are also provided.

4.3.1 **The population size: Large and continuing to grow**

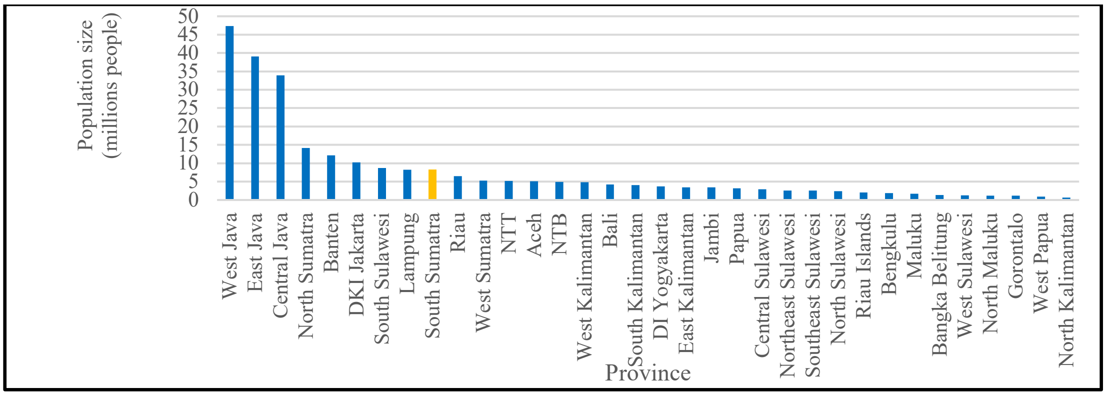
South Sumatra's population is large. In 2015 the population had surpassed the eight million mark (see Figure 4.3), and as of 2016, the population size was larger than the combined population of several Southeast Asia's countries such as Brunei, Timor Leste, and Singapore[56]. In the same year, South Sumatra was classified as the ninth most populous province of Indonesia. The eight provinces with larger populations than South Sumatra were West Java, East Java, Central Java, North Sumatra, Banten, Jakarta, South Sulawesi, and Lampung (see Figure 4.4).

Figure 4.3. The size South Sumatra's population 1971–2045.



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2017a) and BPS (2015d).
Note: Data for 1971, 1980, 1990, 2000 and 2010 were based on the population census during that year. Data for 2005 and 2015 were based on the SUPAS during that year, and data for 2025 and 2045 are population projections based on SUPAS 2015.

Figure 4.4. Indonesia's population by provinces, 2016.



Source: Drawn by the author based on BPS (2015d).

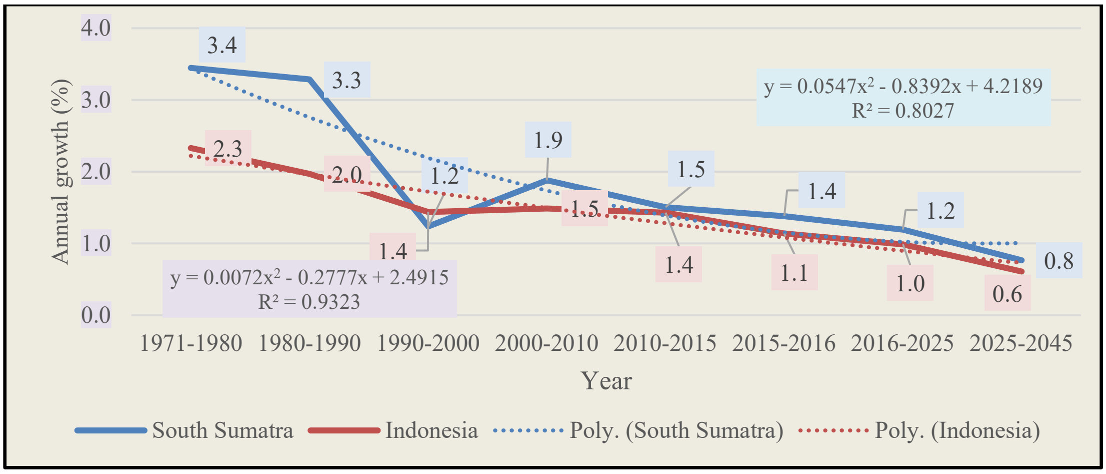
[56] In mid-2016, the total population of Brunei was less than 500,000 while the population of Timor Leste was around 1.3 million and Singapore was 5.6 million (PRB, 2016, p. 13).

Furthermore, the large population of South Sumatra has grown steadily over time (see Figure 4.5). It was only around 2.9 million in 1971, then four and a half decades later, it increased to 8.2 million in 2016 (see Figure 4.3). This shows that there have been 5.3 million additional people between 1971 and 2016, almost twice South Sumatra's population in 1971 (Figure 4.3).

It is true that series data on population growth indicated that the growth of South Sumatran happened at a reduced rate during 1971–2015. During 1971–1980 and 1980–1990, the population grew by more than 3% per annum, whilst its annual growth rate during those two decades, dropped by 0.16 percentage points, from 3.45% to 3.29% (see Figure 4.5). Yet, compared with the national situation, the pattern of population growth rate in South Sumatra has been historically higher than that at the national level. This regularly occurred during the census periods 1971–1980, 1980–1990 and 2000–2010 and the period between the 2010 census and 2015 intercensal population survey. The exception is the period between the 1990 and 2000 censuses, when the population growth rate in South Sumatra declined faster than that in Indonesia (see Figure 4.5).

Furthermore the population in South Sumatra is projected to reach 9.1 million in 2025 and then 10.6 million in 2045 (BPS Provinsi Sumatera Selatan, 2017a). In other words, there will be 2.4 million additional people between 2016 and 2045, which is almost equal to South Sumatra's population in 1971.

Figure 4.5. The rate of population growth of Indonesia and of South Sumatra, 1971–2045.

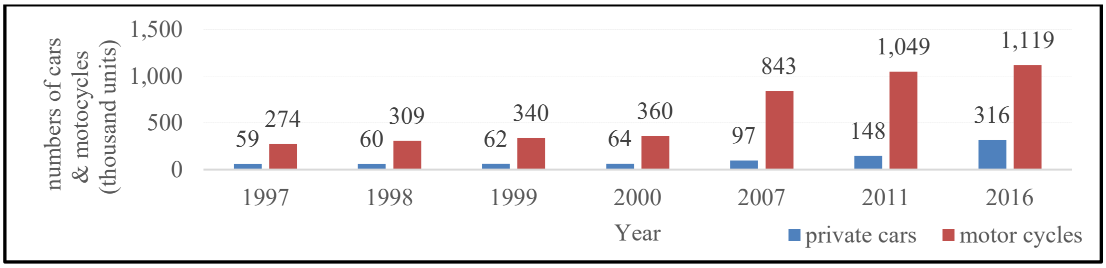


Source: Calculated by the author based on BPS Provinsi Sumatera Selatan (2017a) and BPS (2015d).

Although a few economists (see Baker, DeLong, & Krugman, 2005; Ozimek, 2016) argue that a large population would be better for the economy by providing potentially more workers to generate economic growth, and by increasing demand for the purchase of products of economic activities such as food and manufactured goods, economic production and its use could also have a detrimental effect on the environment. The greater the economic production, the greater is the use of fuel and energy, which means polluting the atmosphere more. Furthermore, large populated regions also experience their own problems: having more people implies a more complex demand for goods and services in the limited space such as that of South Sumatra. As such, a large population will create a larger number of consumers and put pressure on the limited natural resources. Such pressure will severely threaten the environment's carrying capacity. Considering the impacts that people put on the environment, Attenborough has so wisely said ″all our environmental problems become easier to solve with fewer people, but harder, and ultimately impossible to solve with ever more people" (Maclean, 2015, p. 87).

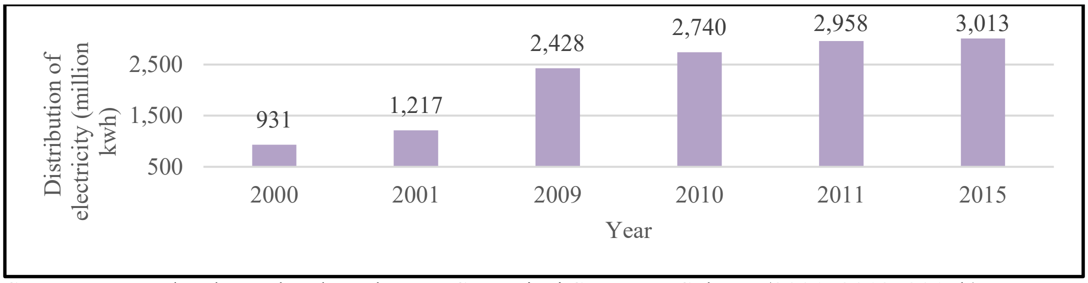
Several indicators reflect the increase in demand for necessities due to rapid population growth in South Sumatra. One obvious indicator is the increase in demand for energy, especially for transportation and electricity. The increase in energy demand for transportation is reflected in the significant increase in the use of private cars and motorcycles as a mode of transportation (see Figure 4.6), whereas a reflection of a significant increase of energy for electricity is shown by the increase of the distribution of electricity by PLN — Perusahaan Listrik Negara or the state electricity company in South Sumatra during the period 2000 to 2015 (see Figure 4.7). Increased use of transportation and electricity in South Sumatra is very crucial to the impact on the environment because cars and motorcycles use fossil fuel energy. In addition, most of the electrical energy in South Sumatra is generated from steam power using fossil fuels, mainly coal. Increasing the use of fossil fuel is a trigger for the emergence of climate change. The above-mentioned points are especially relevant for South Sumatra where the population has increased from 2.9 million in 1971 to 8.1 million in 2015 and is projected to increase to 10.6 million by 2045 (Figure 4.3).

Figure 4.6. Numbers of cars and motorcycles recorded at South Sumatra's regional revenue services, in 1997–2016.



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2001, 2012, 2017b).

Figure 4.7. The distribution of electricity by the state electricity company in South Sumatra (million kwh), in 2000–2015.



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2001, 2012, 2017b).

To some extent, some households in South Sumatra also have not used energy wisely or adopted energy-saving habit in their daily lives. Regarding the use of electronic equipment, making a few small efforts, such as switching off electronic appliances when they are not in use, can make a difference in energy conservation. However, according to BPS (2013a, p. 49), more than 13% of South Sumatra's households 'often' did not turn off their televisions, even though nobody watched it. Under the same condition, more than a quarter of the households did not turn off their televisions for 'sometimes'. Moreover, the bulk of households also have not made efforts to reduce their use of fossil fuel for transportation. According to BPS (2013a, p. 98), of all households having access to private-motorised transport, 80% households had not attempted to reduce the frequent use of their private-motorised vehicles. While the majority of those who made an effort, they did it mostly for economic motives and not based on concern for the environment (BPS, 2013a, p. 99).

A key factor affecting population growth is the fertility rate. During 1968 to 2007, the TFR[57] (total fertility rate) of South Sumatra was always above the replacement level

[57] TFR is defined as the estimated number of births a woman will experience over the course of her reproductive life (BPS, 2012a).

of fertility[58] (2.1), which in time affects the growth of the population size. Nevertheless, except in the period 2000–2010, the TFR of South Sumatra and Indonesia tended to decline (see Table 4.1), although the data also show that South Sumatra's TFR has always been higher than Indonesia's, except in the period 1990–2000. This implies that other than in the year 1990–2000, during 1968–2007 on average the total number of children born to women in South Sumatra was above the Indonesian average.

Table 4.1. Indonesia and South Sumatra's total fertility rates based on population census from 1971–2010[59].

Area	TFR							Decreased rate					
	SP711 (1968)	SP80 (1977)	SP90 (1987)	SUPAS95 (1992)	SP2000 (1997)	SUPAS05 (2002)	SP2010 (2007)	1968-1977	1977-1987	1987-1992	1992-1997	1997-2002	2002-2007
SS	6.33	5.99	4.22	3.14	2.88	2.36	2.56	1.4	3.2	6.1	1.7	5.0	-2.5
Indonesia	5.61	4.68	3.33	2.80	2.34	2.26	2.41	2.0	3.9	3.5	3.6	0.7	-1.3

Source: Prepared by the author based on BPS (2012a).

Due to concerns about excessive population growth, in the 1970s the Indonesian government introduced a strong family planning campaign to reduce family size. This program focused on educating people on how to regulate and space the number of children. The campaign did not only serve to change married couples' perceptions on the value of shifting from a large to small family size, it also provided cheap, safe and effective contraceptive methods (Frankenberg, Sikoki, & Suriastini, 2003).

Table 4.2. Proportion of married women obtaining modern and traditional contraceptives in Indonesia and South Sumatra (1991–2007)[60].

Area	Obtaining contraceptives									
	Modern					Traditional				
	1991	1994	1997	2002	2007	1991	1994	1997	2002	2007
SS	44.6	50.1	54.8	58.6	62.6	2.5	2.8	3.1	2.8	2.1
Indonesia	47.1	52.0	54.7	56.7	57.4	2.6	2.7	2.7	3.6	4.0

Source: Prepared by the author based on BPS (2012a).

Furthermore, family planning was also embraced by the community, including religious and community leaders (Frankenberg et al., 2003). The family planning campaign contributed to the dramatic fertility decline in Indonesia, as there were more and more married women obtaining modern contraceptives during the period 1991–

[58] The replacement rate of fertility is "the rate at which a given generation can replace itself (Solomon-Fears, 2011, pp. crs-35)", which is equal to 2.1.

[59] TFR was based on own-children method (OCM). SP refers to population census, while SUPAS refers to Intercensal Population Census. The year in the bracket refers to the reference year of fertility in relation to the data collection.

[60] BPS measured these indicators based on SDKI – *Survei Demografi Kesehatan Indonesia* (Demographic and Health Survey).

2007 (see Table 4.2). In fact, more than half of married women had already used modern contraceptives since 1994 both in South Sumatra and Indonesia. Furthermore, since 1997 the proportion of married women accessing modern contraceptives in South Sumatra was higher than the proportion at the national level. To some extent, this factor contributed to a lower rate of population growth in South Sumatra compared to Indonesia during the period between 1990 and 2000. However, with a change in the political leadership of Indonesia in 1998, the institutional support for the family planning program weakened (Hull, 2002). Hence, the 2010 population census reflects an increase of TFR, both at South Sumatra and at the national level (see Table 4.1 and Figure 4.5).

4.3.2 **A growing urbanization and its impact on the environment**

Besides fertility, another key driver of South Sumatra's population growth is migration. According to the 2010 population census, there were more than 228,000 persons interprovincial recent in-migrants in South Sumatra which accounted for 3.4% of South Sumatra's population in that year (see Table 4.3). An increase in recent in-migrants would have a direct impact on the landscape. While fertility adds younger people to a household, recent in-migration brings new persons or families to South Sumatra and these people need to be housed. Furthermore, recent in-migrant data by urban/rural areas shows that most of the recent in-migration to South Sumatra is into urban areas.

Table 4.3. Numbers of recent in-migrants[61] and population aged five years and above in South Sumatra in 2010.

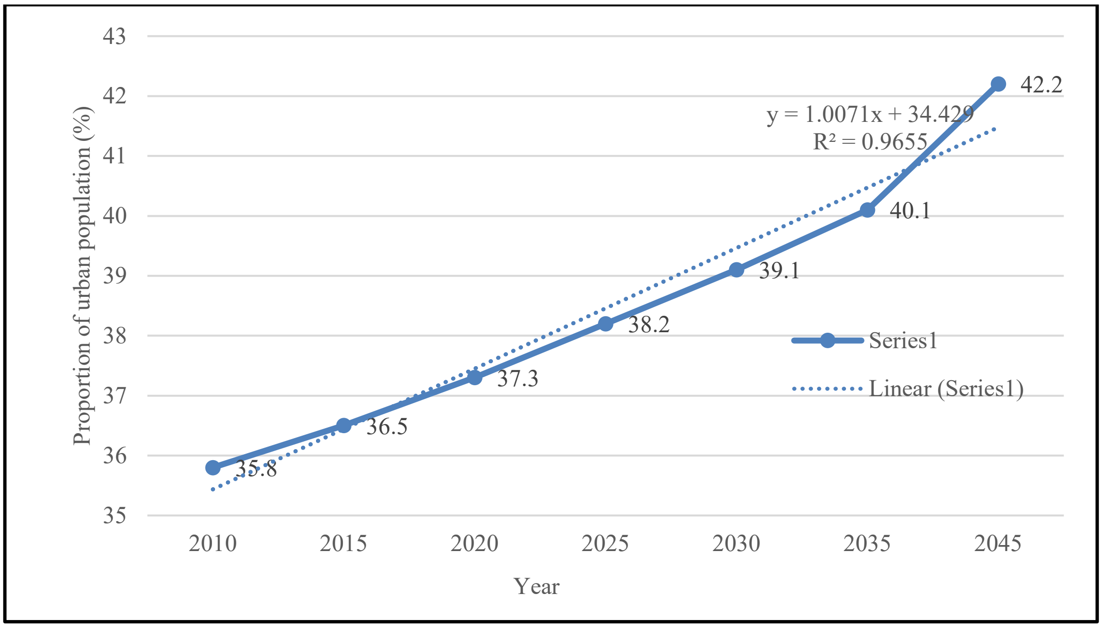
Category	Recent in-migrants (aged five years and above)			Total population of South Sumatra aged five years and above		
	Urban	Rural	Total	Urban	Rural	Total
Total	112,340	116,363	228,703	2,405,925	4,277,626	6,683,551
Migrants to urban areas as percentage of urban population				4.7		
Migrants to rural areas as percentage of rural population				2.7		
Migrants as percentage of population				3.4		

Source: Prepared by the author based on BPS (2010a).

[61] Recent migration refers to migration of people aged minimum five years old in the last five years. A person is categorised as a recent migrant if the current location of this person is different from the place this person lived five years ago check indents here, compare with others BPS (2010a).

Table 4.3 shows that the interprovincial migrants in the urban areas accounted for 4.7%[62] of the total urban population of South Sumatra (aged five years and above), while in rural areas, the interprovincial migrants accounted for a much smaller percentage (2.7%) of the total rural population. Thus, proportionately, urban areas of South Sumatra attracted 1.7 times more interprovincial migrants than rural areas. These data strongly support the push-pull theory of migration (see Lee, 1966) that migrants are more attracted to urban areas that have better prospects than rural areas, which then drives the increase in urbanisation. Furthermore, spatial data based on urban/rural differences indicated that parallel to population growth, South Sumatra is now more urbanised. Figure 4.8 shows that in 2010, it was roughly 35.8% of South Sumatra's population inhabited in urban areas, however five years later, the urban population in South Sumatra increased to 36.5% of the province total (BPS, 2013b, p. 36).

Figure 4.8. The proportion of urban population in South Sumatra, 2010–2045.



Source: Drawn by the author based on BPS (2013b, 2018a).

Urbanisation has often been credited with an increase in people's income and acceleration of economic development or infrastructure (Acemoglu, Johnson, & Robinson, 2002; Duranton, 2015; Maniriho & Nilsson, 2018; Quimba & Estudillo, 2018; Sadorsky, 2018). However, urbanisation is also liable to bring in harsh challenges to environmental sustainability (Bettencourt & West, 2010; Gudipudi,

[62] The proportion of recent migrants with the total population five years and above.

Fluschnik, Ros, Walther, & Kropp, 2016; Sadorsky, 2018), as it changes the environment dramatically by putting more pressure on the already deteriorated environment in the urban areas through worsening problems of land insecurity, inadequate sanitation, increasing air pollution, noise and garbage in the urban areas.

Negative impacts of urbanisation are various. First, urbanisation creates additional loads of people in crowded urban areas in addition to the already crowded population, and thus puts more pressure on the congested urban environment. Additional people would mean additional demand on fresh water, land, food, electricity, and so on (Hardoy, Mitlin, & Satterthwaite, 2013; Seto, Solecki, & Griffith, 2015).

Furthermore, previous studies not only argue that per capita consumption of urban dwellers was much higher than that of rural dwellers (Pugh, 2014). These studies also point out that emissions generated in urban areas is enormous. For example, cities currently consume more than two-thirds of the world's energy and account for an almost identical proportion of the global greenhouse gas emissions (The World Bank, 2010). Likewise, some other research also indicate how pollution has been escalating in regions where the population is highly concentrated (He, Gao, Huang, Ma, & Dou, 2017; Shi et al., 2008). Thus, in many urban areas of developing countries the air, water and soil contamination have been major threats to public health (Azizullah, Khattak, Richter, & Häder, 2011; Cao, Zhu, & Chen, 2007; Chakraborty & Mukhopadhyay, 2014; Ghosh, Rabha, Chowdhury, & Padhy, 2018; Weerasundara, Magana-Arachchi, Ziyath, Goonetilleke, & Vithanage, 2018).

Urbanisation also has a large influence in the conversion of the natural landscape. Any addition to the number of people in the already densely populated areas hastens the amount of built infrastructure, e.g. for settlement and transport infrastructure, and such an expansion drives loss of farmland, forest and other green areas. Furthermore, when the contours of the land are changed and not carefully managed, it can quickly lead to ecological disasters such as flooding (Chen, Zhou, Zhang, Du, & Zhou, 2015; Miller & Hutchins, 2017; Zhang, Ma, & Wang, 2008). In the long term, it will lead to global climate change and threaten biodiversity (Solecki & Marcotullio, 2013). Hence, rapid urbanisation will exacerbate environmental problems that already exist in the city leading to more pressure on the already limited resources and causing environmental decay.

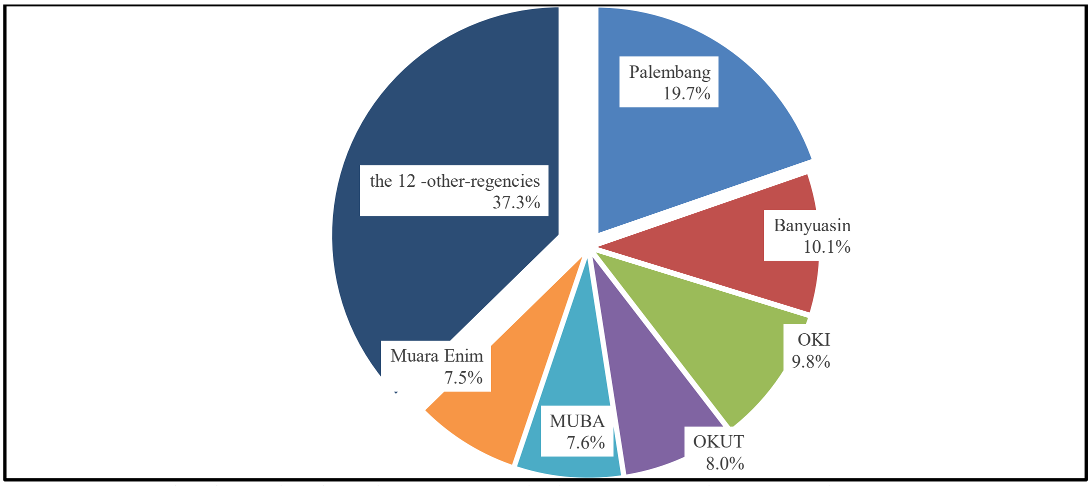
The above-mentioned facts are true for South Sumatra, particularly its capital city Palembang which has experienced increased urbanisation. During 1990-2000, there were only three big cities of Indonesia with annual population growth rates that exceeded the national population growth rate. One of these cities was Palembang (see Firman, 2004).

4.3.3 **Population dynamics and their environmental challenges**

4.3.3.1 ***Distribution by location***

Furthermore, the South Sumatra's already large population has also been growing disproportionately across its regencies/cities. In 2018, almost one-fifth of all South Sumatra's population lived in the capital city, Palembang. More than one-third of the remaining population resided in five regencies, i.e. Banyuasin, OKI, OKUT, MUBA and Muara Enim. The balance of the population, which accounts for less than 40%, is located in the larger area of South Sumatra spread over 12 other regencies (see Figure 4.9).

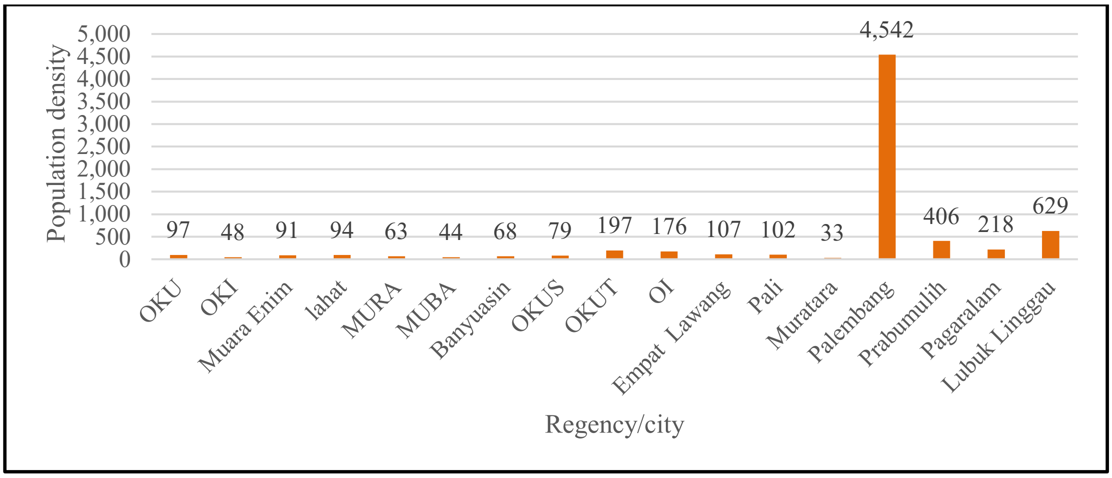
Figure 4.9. The distribution of South Sumatra's population, 2018[63].



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2018b).

[63] Projected based on 2015 SUPAS.

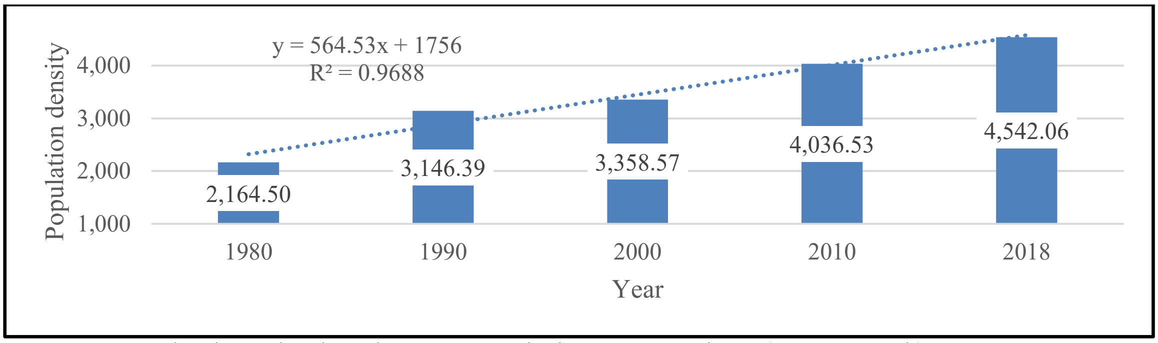
Figure 4.10. Population density in South Sumatra based on regions in 201863 (persons/km^2).



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2017c, 2018b).

A consequence of an unequal distribution of a population is an unequal density. Figure 4.10 shows the most crowded city in South Sumatra in 2018 was Palembang, with a population density of 4,542 persons per km^2 in 2018, this was 137 times more than that of Muratara. The second most densely populated region of South Sumatra is Lubuk Linggau, which has a density of about 555 persons per km^2 in the same year. Meanwhile, the other populous regions within South Sumatra, such as Banyuasin, OKI, OKUT, MUBA and Muara Enim have lower population densities. They also have larger areas than Palembang. Furthermore, data on Palembang's density across the years show a vast increase from 2,164.50 persons per km^2 in1980 to 4,542.06 persons per km^2 in 2018, i.e. more than double in 38 years (see Figure 4.11), making this city over-populated and over-crowded compared to the other regions.

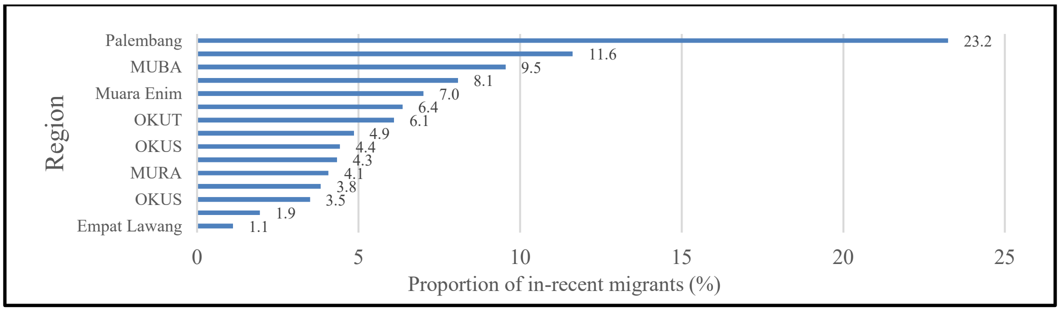
Figure 4.11. Population density in Palembang during 1980–2018.63



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2017a, 2018b).

Migration has a close association with the massive increase of density in Palembang. According to the 2010 population census, almost a quarter of South Sumatra's recent in-migrants from other provinces migrated to Palembang. This statistic was immense compared to the figure of recent in-migration into other regencies/cities in South Sumatra (see Figure 4.12). In South Sumatra, the high level of recent in-migration into Palembang is highly associated with the geographical differences in economic activities within the province. As the most urbanised area in the region, Palembang is the Centre of manufacturing business; which absorbs more labour force than the agricultural sector. In 2010, more than 40% of the large and medium sized manufacturing industries in South Sumatra were located in Palembang (BPS Provinsi Sumatera Selatan, 2011), while other manufacturing industries were concentrated in urban areas such as Banyuasin, MUBA, OKI and Muara Enim which were also receiving large numbers of in-migrants according to the 2010 census (see Figure 4.12).

Figure 4.12. Proportion of recent in-migration to South Sumatra, 2010.



Source: Drawn by the author based on BPS (2010b).

This unevenly distributed population of South Sumatra can also affect the environment. According to FAO (2016) an uneven population distribution has made regions like Africa, Southeast Asia, and Latin America vulnerable to deforestation. Land-use changes mostly cause this environmental degradation because of agricultural expansion and the development of urban areas, infrastructure and mining (FAO, 2016, p. 20). Land-use changes severely affect the environment by altering the global carbon pathway and, possibly, the average climate over the earth; to the vast transformation of the ecosystems on the planet (Foley et al., 2005; Song et al., 2018). In Africa, Southeast Asia and Latin America, the changes in land-use have impacted not only on land degradation, soil erosion, and a decrease in clean water, but also on the loss of biodiversity and the release of carbon into the atmosphere (Boucher et al., 2011; De Sy et al., 2015; Hosonuma et al., 2012; Kreidenweis et al., 2018). Consequently, any further population growth in these areas which places unprecedented demands on natural resources may lead to the conversion of more forests to other land-uses which will put more pressure on the already deteriorated environment.

As noted previously, continued urbanisation in South Sumatra escalates the rapid growth of population in the cities, such as Palembang or Lubuk Linggau, which increases the environmental impacts on a higher concentration of people in those already densely populated cities. This in turn impacts on additional necessities for housing, fresh water, fossil fuel transport and other basic necessities which are already threatening the environmental sustainability of the city (Seto et al., 2015). Such condition stimulates environmental challenges in the future.

4.3.3.2 *Distribution by gender and age*

Boyle and Halfacree (2002) argue that gender has a say on who was migrating, how they were migrating and the migration destination and origin. In South Sumatra's case, Table 4.4 shows that males are more mobile, 118,180 males compared to 110,523 females, with a sex ratio of about 107 males for every 100 females. However, if we disaggregate the figure based on urban/rural, the data show that the male migrants are more attracted to rural areas whereas females are more attracted to urban areas. A high level of adult female migrants to urban areas would adversely impact the higher level of fertility in urban areas. The increase in the birth rate, coupled with the transfer of population, might in some situations lead to an absolute growth in the population living in urban areas.

Table 4.4. Numbers of recent in-migrants[64] and population five years old and above based on sex in South Sumatra in 2010.

Category	Recent in-migrants (aged five years and above)			Total population of South Sumatra aged five years and above			Recent in-migrants as percentage of South Sumatra population aged five years and above		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Female	56,681	53,842	110,523	1,200,690	2,084,325	3,285,015	4.7	2.6	3.4
Male	55,659	62,521	118,180	1,202,235	2,193,301	3,398,536	4.6	2.9	3.5

Source: Prepared by the author based on BPS (2010a).

[64] Recent migration refers to migration of people aged minimum five years old in the last five years. A person is categorised a recent migrant if the current location of this person is different from the place this person lived five years ago (BPS, 2010a).

As mentioned before, combined with other factors, the incoming population could drive a gender imbalance in any region. Consequently, one of the effects that fertility and migration brings to the population dynamic is changes in the sex ratio. The sex ratio indicates the ratio of males per 100 females; hence it describes the balance between males and females in a population. Series data on sex ratios in South Sumatra suggests the presence of immigration. Table 4.5 indicates that the low sex ratios in the age-groups 15–19 and 20–24 in 1980, logically appear ten years later in 1990 in the age-groups 25–29 and 30–34. The same low sex ratios should appear in the age-groups 35–44 ten years later in 2000 and then 45–54 20 years later in 2010, but this is not so. This suggests the presence of large immigrant flows in the age-group 35–44 during 1991–2000, which register an excess of men in those age-groups of the population.

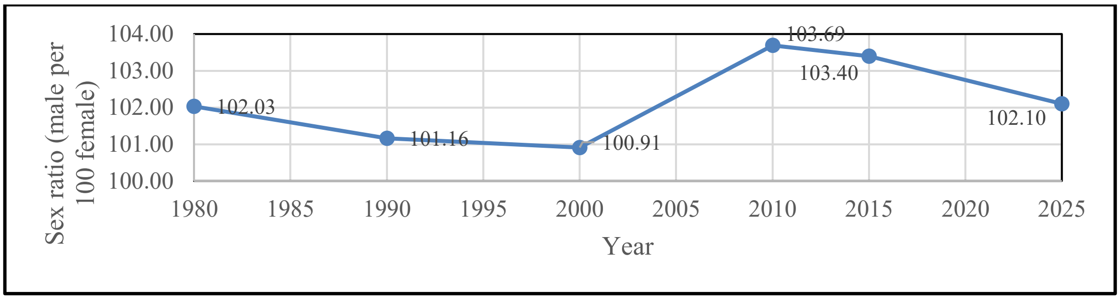
Table 4.5. South Sumatra's sex ratio in 1980–2025.

Age-group	Sex ratio					
	1980	1990	2000	2010	2015	2025
0–4	104.24	104.98	99.31	105.74	104.1	102.4
5–9	105.11	103.01	101.87	106.35	103.7	102.2
10–14	104.02	104.53	101.76	105.45	102.8	103.7
15–19	97.07	102.34	99.54	104.81	103.1	103.5
20–24	93.49	92.23	95.95	102.01	104.5	102.5
25–29	101.18	90.10	96.85	104.07	105.8	102.1
30–34	107.41	99.08	99.42	104.81	105.7	103.2
35–39	104.35	107.14	101.06	105.03	105.5	104.5
40–44	104.57	105.80	107.58	102.21	104.4	104.6
45–49	104.46	103.55	113.51	101.64	103.3	104.9
50–54	105.49	105.71	111.69	106.50	103.0	103.3
55–59	104.47	102.28	107.31	112.28	103.5	100.7
60–64	100.21	99.32	102.31	96.16	102.3	98.7
65–69	100.09	100.75	93.21	92.87	99.4	97.2
70–74	88.18	96.81	99.73	86.18	83.7	93.6
75 +	78.68	85.38	85.55	75.95	76.6	79.7
Total	102.03	101.16	100.91	103.69	103.4	102.1

Source: Prepared by the author based on BPS Provinsi Sumatera Selatan (2017a) and BPS (2010a).

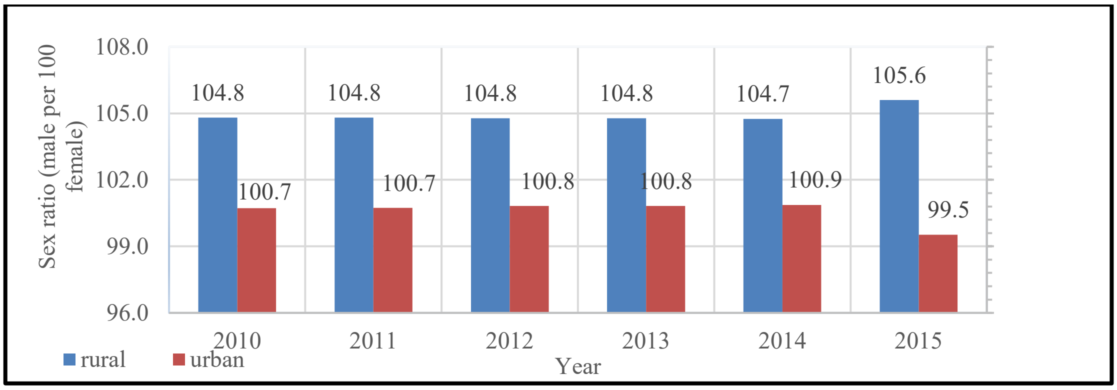
In general, four decades of census data from 1980–2010 yield insights into the changing sex ratio phenomena (see Figure 4.13). In total, South Sumatra's sex ratio in 2010 was 103.7 meaning for every 100 females, there were 103 to 104 males. Compared to the sex ratio in 1980, the 2010 sex ratio indicated that South Sumatra's people tend to be more masculine. However, the sex ratio between urban and rural areas indicates a different pattern with the population of rural areas more masculine during 2010–2015 (see Figure 4.14) and in the same period, the population of urban areas tending to be more feminine.

Figure 4.13. South Sumatra's sex ratio in 2000–2025.



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2017a) and BPS (2010a).

Figure 4.14. South Sumatra's sex ratio in 2010–2015 based on urban/rural.



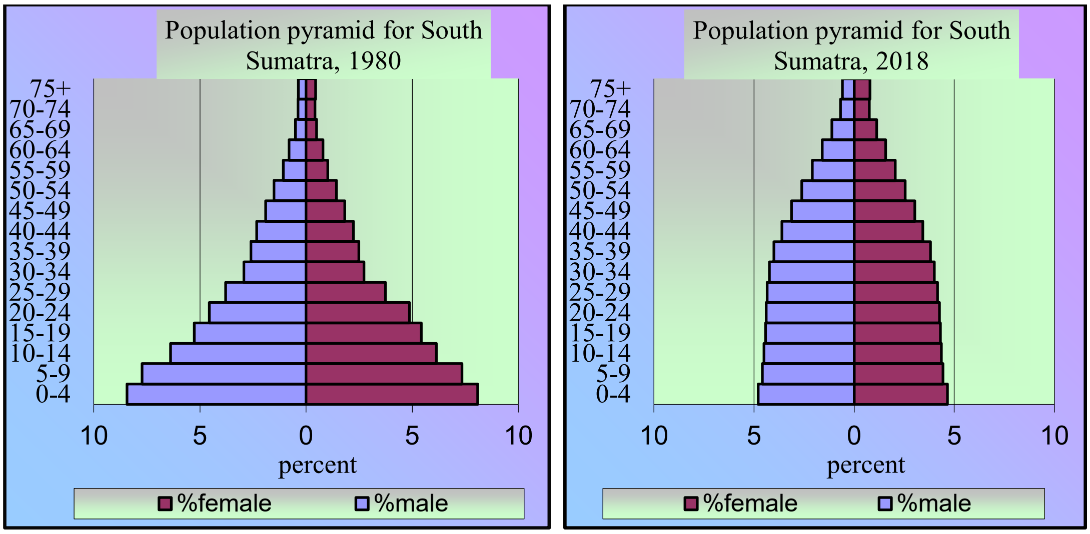
Source: Kementrian Pertanian RI (2014, pp. 69–74).

Aspects of gender dynamics within a population are also important aspects to be included in the discussion related to environmental conservation. Since the population of South Sumatra tends to be more masculine, it will also have an impact on population-environmental pressure in the future. Indeed, research in the 1980s examining the influence of gender/sex on the environment has found mixed results. Studies show that females tend to have more environmental concern than males (Van Liere & Dunlap, 1980), some others have not found any such relationship between gender and environmental concern (Arcury, Scollay, & Johnson, 1987). However, more recent reviews and findings (e.g., Vaske, Donnelly, Williams, & Jonker, 2001) have concluded that females indeed tend to be more environmentally concerned than males. On the other hand, gender differences were not found in specific environmental attitudes concerning forest management (McFarlane & Hunt, 2006). Based on the above-mentioned reviews, the role of gender in environmental behaviour appears to be inconclusive. Therefore, it would be interesting to find how gender affects environmental behaviour of individuals in South Sumatra.

The structure of the population by sex and age can be presented in the form of a population pyramid, which shows the distribution of a population by different gender and age cohorts. The shape of the population pyramid gradually evolves over time based on fertility, mortality, and migration trends.

During 1980–2018 the population pyramid for South Sumatra changed significantly (see Figure 4.15). In 1980, the base was wide, while the upper shape was conical. Thirty-eight years later, the base of the 2018 pyramid has shrunk, while its upper end tends to enlarge.

Figure 4.15. South Sumatra's population pyramid in 1980 and 2018.



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2013, 2017a).

The broad base of the population pyramid in 1980 tells us about the presence of a high incidence of birth in the past. In contrast, a cone-shaped with a narrow top within the 1980 population pyramid suggests that this large birth rate in the past was accompanied by a high infant mortality rate. As such, it led to a lower proportion of people living to adulthood. In 2018, the population pyramid has a rather plump body with a smaller base showing the presence of a lower level of fertility. As the fertility rate during 1980–2018 reduced, the proportion of the population at age-groups 0–4 and 5–9 decreased. Furthermore, the 2018 population pyramid also indicated that the population is ageing more than before as there are wider pyramid bars from the middle age-groups up to the top of the pyramid showing a greater proportion of the population living to older ages.

In fact, the series of population censuses indicate that the median age[65] of the population of South Sumatra increased by more than eight years over the period 1980–2010; from 17 years in 1980 to 25 years in 2010 (see Table 4.6). This suggests that South Sumatra has shifted from being categorised as a young populated region in 1980 to an early medium age populated region in 2018. This study considers an area as a 'young populated region' when its median age is less than 20, and if the median age is between 20 and 30, it is categorised as a 'medium' old region; then a median aged population above 30, is categorised as an 'old populated region'. Although the population in South Sumatra is still relatively young compared with Indonesia's population in general, series data from 1980 to 2018 indicate that both the populations of South Sumatra and Indonesia tend to be ageing. In the next several decades, population ageing will have a range of implications for South Sumatra, including; health, size of the working-age population, housing and demand for skilled labour.

Table 4.6. Median age of Indonesia's and South Sumatra's population, 1971–2018.

Area	1980	1990	2000	2010	2015[66]	2018
South Sumatra	17.3	18.4	22.1	25.2	26.6	27.6
Indonesia	19.3	21.3	24.7	27.2	28.5	29.5

Source: Prepared by the author based on BPS (2013b, 2015d) and BPS Provinsi Sumatera Selatan (2017a).

In addition, the age composition of a population can also have an effect on the environment because different population subgroups behave differently. South Sumatra has both the largest cohort of young people (age 30 and under) and the largest proportion of elderly in history. Young people are more likely than their older counterparts to migrate, primarily as they leave the parental home in search of new opportunities. As a result, given the relatively large younger generation, we might anticipate increasing levels of migration and urbanisation, and therefore, intensified urban environmental concerns.

4.3.3.3 *Distribution by employment and education*

Figure 4.16 also suggests that there is a growing number of potential workers within South Sumatra. As during the period 1980–2018, the proportion of working-age (15–64 years) increased whereas the proportion of youth (below 15 years) and retired (over

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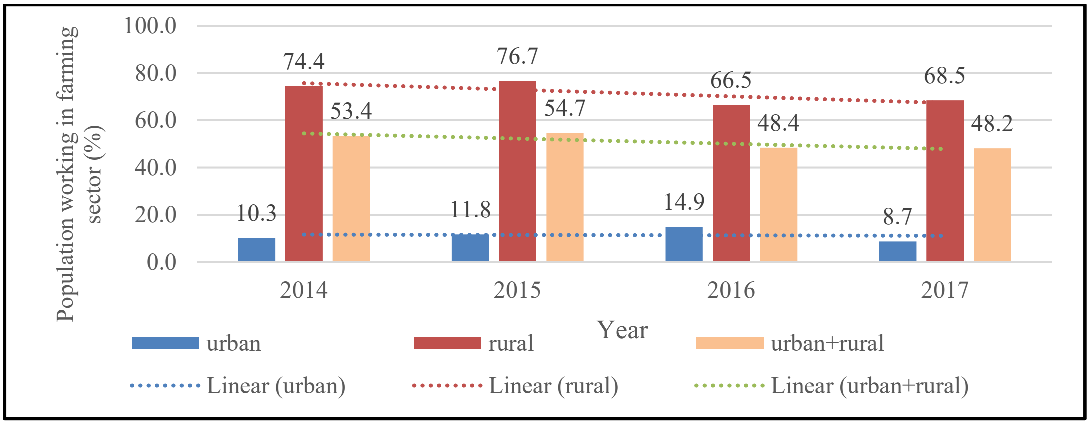
[65] Median age is the age of the midpoint of a population.

[66] Calculated by adopting median formula from the data of population based on age-group.

64 years) decreased. This brings concerns regarding how the changing demographics will affect the employment growth, as well as how this working-age population will be supported.

Figure 4.16. Proportion of people working in farming sector based on urban and rural during 2014–2017.



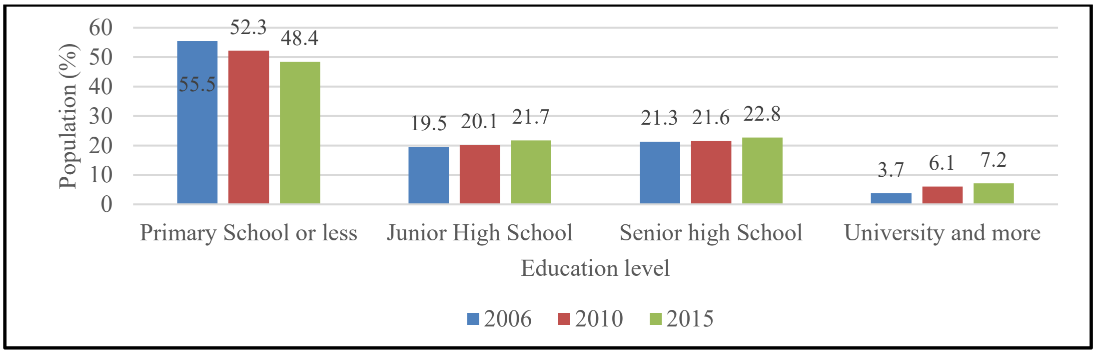
Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2018a, pp. 13–15).

Up to 2015, the farming sector was the backbone of employment around South Sumatra with more than half of the population working in the farming areas (Figure 4.16). Most of these workers resided in rural areas and were planting crops such as coffee and rubber, or working in rice farming, however, as the province is rapidly urbanising, the proportion of farming employment has decreased. During 2014–2017, the proportion of people working in the farming sector decreased from 53% to 48% (Figure 4.16). This decrease occurred in both urban and rural areas. Although employment jobs in the farming sector decreased, the proportion of rural workers employed in this sector was still over 60% in 2017.

Previous publications have examined the relationship between education level and workers' employment, and Herrendorf and Schoellman (2018) highlighted that agricultural workers in several countries, including Indonesia, tend to have fewer years of formal education than workers in other sectors. In fact, the population of South Sumatra is considered to be less educated, as suggested by Figure 4.17. Up to 2010, more than half of the population aged 15 years and over had only completed elementary education or less. Although this proportion tended to gradually decrease to reach 48.4% in 2015, but still accounted for as many as 1.8 million people[67].

[67] According to BPS Provinsi Sumatera Selatan (2018a), in 2015 the population of South Sumatra above 15 years was around 3.7 million.

Figure 4.17. South Sumatra's population age 15 or more based on level of educational attainment in 2016–2015 (%).



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2016b).

The educational aspect was also an important factor to be included in the discussion of population and the environment, especially because education greatly influences current habits that will also impact on the pressure that people put on the environment. Currently, many South Sumatrans live near the river and tend to habitually use the river as a source of drinking water, income generation (through fishing) and for bathing and washing. According to the 2011 village potential census, around 2,116 villages in South Sumatra use the river for bathing and washing (BPS, 2011b). Bathing and washing in the river produce an adverse effect on the biodiversity of the river, particularly when people use soaps and detergents.

4.4 The current state of the environment

South Sumatra is one of the provinces in Indonesia blessed with a beautiful landscape. The physical geography of South Sumatra is varied, but in general, it has coastal areas, lowlands and swamp areas in the eastern side as well as hills and mountains in the west (BPS Provinsi Sumatera Selatan, 2017b). The mountainous area of South Sumatra is a part of '*Barisan* Mountain' of Sumatra, which was lifted and folded by the subduction of the Indian Ocean Plate under the *Sunda* Shelf (Bonatz, Miksic, & Neidel, 2009). *Barisan* Mountain is an Indonesian term for 'rows of hills' and the highest peaks of *Barisan* Mountains in South Sumatra include *Seminung* Mount, (1.964 mamsl[68]), *Dempo* Mount (3,159 mamsl[l]), *Patah* Mount (1.107 mamsl[l]), and *Bungkuk* Mount (2.125 mamsl[l]) (Bappeda Provinsi Sumatera Selatan, 2012). The eastern side of South Sumatra consists of a broad plain which was formed over the millennia by alluvial sediments carried from the *Barisan* Mountains by Sumatran rivers, including the *Musi*

[68] mamsl = metres above mean sea level.

(Bonatz et al., 2009), which enriched the soil with peatlands and mangroves (Bappeda Provinsi Sumatera Selatan, 2012).

Furthermore, this province has a remarkable range of tropical ecosystems. Its lands, forests, rivers and waterfalls provide the people with abundant natural resources, ranging from renewable resources such as prime agriculture soils, several large rivers with Musi River as their estuary, abundant wildlife including fauna and vegetation; and non-renewable resources such as petroleum, coal and natural gas (BPS Provinsi Sumatera Selatan, 2017b). However, while the lowland in the east is mostly wetland which is often affected by tides and vulnerable to flood (Bappeda Provinsi Sumatera Selatan, 2012), this area is at greatest risk from uncontrolled burning and wildfires (Lambert & Collar, 2002). Furthermore, the hills and mountainous areas, such as Lahat, Pagar Alam and OKU — Ogan Komering Ulu, are prone to earthquake disaster (Siswanto, 2009).

This subsection describes the state of the environment of South Sumatra based on the condition of its forest, water, and household disposal.

4.4.1 **The state of the forest**

Forests are essential for people, the planet and wildlife: people depend on forests to survive, from the air they breathe to the wood they use. Besides providing habitat for animals and livelihood for humans, forests also offer watershed protection, prevent soil erosion and mitigate climate change. Yet, despite their dependence on forests, people are still allowing the forest to disappear for their economic benefit.

South Sumatra has a massive forest area with around 40% of the province designated as forest (KLH, 2018c), whilst the remaining land area is made up of non-forest public lands (see Table 4.7). Most of South Sumatra's forest area is maintained as permanent forest in accordance to three functions. First, production forests (including permanent and limited production forest) cover a total area of 1.9 million hectares, or 56% of the forest area. Second, conservation forests cover a total area of 0.7 million hectares or 22% and third protection forests which have watershed functions and cover the remaining 0.6 million hectares or 17%. All forest area must be preserved and utilised for the greatest importance of the people of South Sumatra and to support the sustainability of the global climate.

Table 4.7. Extent of land cover types in forest[69] area and non-forest area in South Sumatra 2017.

Characteristics of area		Area (thousands hectares)	% of forested area	% of total land
A. Forest area		3408.8	100	40
a. Permanent forest		3247.8	95	
	1. Conservation forest	741.7	22	
	2. Protection forest	578.3	17	
	3. Limited production forest	213.9	6	
	4. Permanent production forest	1713.9	50	
b. Convertible production forest		161	5	
B. Non forest area		5218.1		60
Total		8626.9		100

Source: Prepared by the author based on KLH (2018c).

As mentioned above, South Sumatran forests are at a risk of deforestation because of activities for economic production. Viewed from the production side, the largest contributors to the sectoral gross domestic products (GDP) of South Sumatra are the mining, farming and manufacturing sectors. In 2014, the contribution of the industrial sector was 17.14%, farming was 17.81% and mining was 23.97% (BPS Provinsi Sumatera Selatan, 2015b). However, mining activities are at odds with environmental preservation, because it disrupts the landscape, removes vegetation and topsoil and threatens water resources and soil fertility.

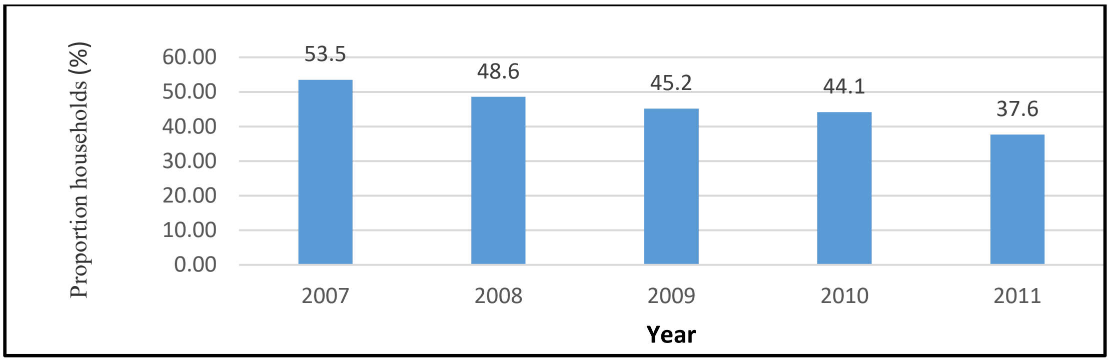
It should be noted that the majority of the mines in South Sumatra produce natural gas, petroleum and coal. According to the Ministry of Energy and Mineral Resources — MEMR (2018), South Sumatra has the largest coal resources and reserves[70] in Indonesia reaching 7.8 thousand million tonnes in December 2017, or as much as 32% of all the total coal resources and reserves in Indonesia (MEMR, 2018, p. 62). According to Noronha (2001) mining industries have adversely impact on large forest clearance and cropland, the reduced in water and air quality, and soil degradation. In addition, Abood, Lee, Burivalova, Garcia-Ulloa, and Koh (2015, p. 60) claimed that

[69] Forest is defined as "a land area of more than 6.25 hectares with trees higher than 5 meters at maturity and a canopy cover of more than 30 percent" (KLH, 2018b, p. 10).

[70] Coal reserves are part of the total coal resource that is economically feasible for extraction at present. The economic feasibility factors include cost, price, technology, and special local circumstances (Blondel & Lasky, 1956).

during 2000–2010, mining activities in Sumatra, Kalimantan, Sulawesi, Moluccas and Papua has accounted of forests loss of approximately 0.3 million hectares.

Figure 4.18. Proportion of households using biomass[71] for cooking in South Sumatra.



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2014).

Furthermore, South Sumatran forests were also threatened by such activities as burning the trees for energy. Up to 2007, more than half of all households in South Sumatra were using biomass for cooking. Although the use of biomass has tended to decrease, up to 2011 it still accounted for more than one-third of households (see Figure 4.18). The consumption of biomass is closely related to forest degradation and deforestation, which will affect the loss of biodiversity and soil degradation (Field et al., 2008). Moreover, the process of wood combustion without installing specific technology for carbon storage will also create greenhouse gases, which will impact on climate change (Vaughan et al., 2018). In addition, the use of biomass indoors will also cause indoor air pollution (Mestl et al., 2007).

4.4.2 The state of the water

South Sumatra has an abundance of surface water resources: 2,806 villages out of 3,237 in South Sumatra have rivers, while 88 villages have lakes/reservoirs (BPS, 2011b). This means almost 90% of all villages in South Sumatra have access to surface water. Some large rivers in this area are *Musi* River, *Ogan* River, *Komering* River and *Lematang* River.

[71] Firewood, charcoal, husk, rice straw, bunches of coconuts, coconut shell , etc.

Figure 4.19. People using the river for bathing and washing.
Left: Two women were doing their laundry in *Ayek Kikim*[72] of Lahat Regency, South Sumatra, on November 2018. Right: People bathing and washing in *Lematang River* of Lahat Regency during dry season 2016.

Source: Private collection.

Abundant surface water resources impacted on a traditionally large dependence of the people who live along the riverbank on the existence of the river, especially in meeting water needs for daily activities. According to the 2011 village potential census, around 2,116 villages in South Sumatra use the river as a means for bathing/washing (BPS, 2011b), as shown in Figure 4.19. Bathing and washing in the river produce an adverse impact on the biodiversity of the river, particularly when people use soaps and detergents.

Meanwhile, people also rely on rivers as their source of drinking water. In 2017[73], around 3.13% of the households reliant on surface water sources, such as springs, rivers, ponds, and lakes. This rate was higher than the average in Indonesia, which was around 1.3% (BPS, 2017d, p. 183; 2018e, p. 188). Most of household utilising rivers as their drinking water source live in rural areas (BPS, 2017d, p. 182), while, the proportion of people who utilised rivers (plus rainfall) as a place for cooking, bathing, and washing was even larger, i.e. 16.27% in 2017 (BPS, 2017d, p. 188). Most of them also resided in rural areas.

Currently, water management in South Sumatra remains heavily dominated by traditional infrastructure however, rivers are not the major drinking water source for

[72] Ayek Kikim is a name of a river in Lahat Regency.
[73] The proportion of households based on type of drinking water in South Sumatra.

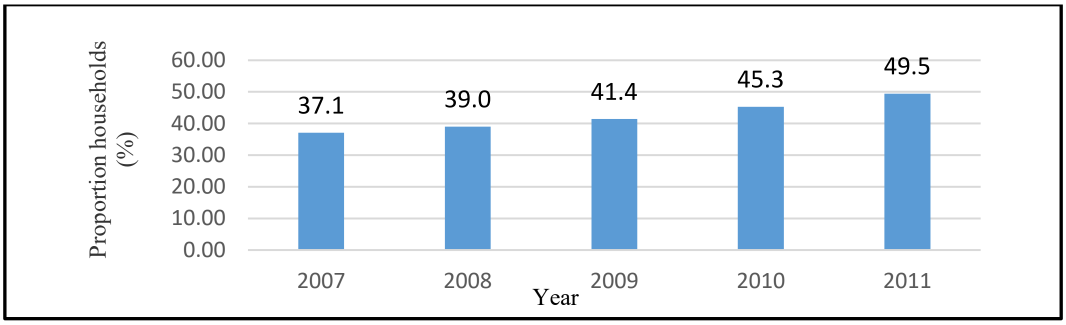
the majority of households in South Sumatra as the majority of the population used wells. However, not all these wells are protected from contamination. In 2017 more than one-third (34%) of the households used protected wells, however there were around 9% still used unprotected wells (BPS, 2017d, p. 183). The latest were mainly residing in rural areas (BPS, 2017d, p. 183).

Figure 4.20. A place for bathing, washing and defecating in a water way at Tanjung Payang, Lahat Regency, on September 2016.

Source: Private collection.

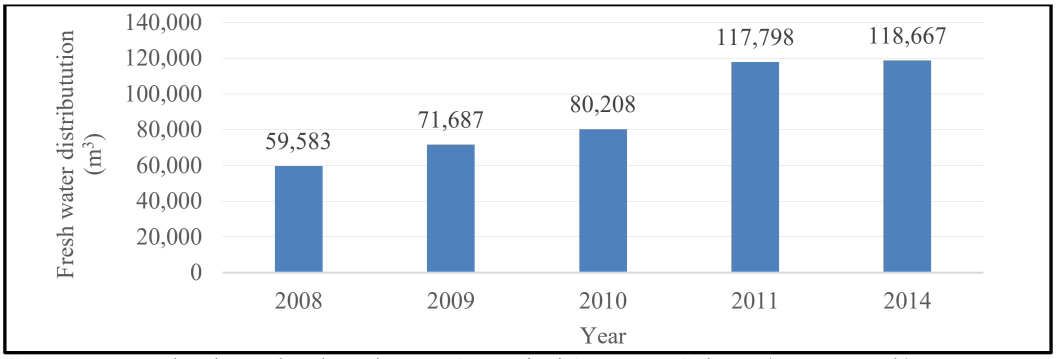
It is also common to build houses on the riverbanks in South Sumatra. Building houses alongside the river is quite dangerous because it renders people prone to flooding and landslides. The high proportion of housing located on the riverbanks is also associated with a high percentage of the usage of toilets without septic-tanks because people living alongside the river often build their toilets there. An example of such toilets is shown in Figure 4.20. Furthermore, statistics on Figure 4.21 shows that although the proportion of households using decent toilets in South Sumatra has increased steadily, until 2011 this proportion was less than 50%. This figure specifies that in 2011, there were more than 50% of households in South Sumatra utilising unsterile toilets that feasibly contaminated the soil/water streams.

Figure 4.21. Proportion of households accessing decent toilet[74] in South Sumatra.



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2014).

Figure 4.22. The distribution of fresh water in South Sumatra (m^3), in 2008–2014.



Source: Drawn by the author based on BPS Provinsi Sumatera Selatan (2012, 2017b).

Population growth has also impacted on demand for fresh water. Currently, local governments have tried distributing clean water to residential houses by piped-water. From 2008–2014, the volume of water distributed by the government through PDAM or *Perusahaan Daerah Air Minum* — the Local Government Owned Water Utilities, continued to grow from 59 million m^3 to 1180 million m^3 (see Figure 4.22), however this infrastructure is not yet accessible to all the people. In 2017, Susenas recorded that households who have access to piped-water was around 17%. Most of these people lived in urban areas and Palembang, the capital city, has the most access (BPS, 2018e, p. 188). However, not all people who have access to piped-water inside their residence have 24-hour access. Other problems included the lack of water quality, which comes out not only from the low capacity of the piped-water system but also that the water is often contaminated by faecal coliform and is unsafe to be consumed without processing steps. Further problems include fluctuating water flow and frequent supply interruption.

According to the World Health Organisation and United International Children's Fund — WHO and UNICEF (2017), water sources should meet three criteria, namely it

[74] BPS Provinsi Sumatera Selatan (2014) defines a decent toilet as an own toilet with septic-tanks.

should be accessible on premises, it should be available when needed, and it should be free from contamination. However, these criteria are still unmet in South Sumatra.

Furthermore, to some extent, households in South Sumatra have not yet participated in promoting water conservation in their daily lives. According to BPS (2013a), South Sumatra's households were still accustomed to allow running water, even though the water is not being used. They are also not yet familiar with re-using greywater. Greywater is relatively clean wastewater which can still be reused, such as used laundry water, or the wastewater from ablutions, bathing or washing dishes. According to BPS (2013a, p. 77), 91.46% of all households in South Sumatra have never used greywater. In addition, of all South Sumatra's households that have access to piped-water, 82.3% often left water running although the water was not being used (BPS, 2013a, p. 74). This condition will significantly affect water sustainability in the future.

4.4.3 **The state of municipal solid waste**

Problems of solid waste have become a major concern in achieving sustainability in South Sumatra, especially its urban areas. Everyday an enormous amount of garbage is discarded into the urban environment. According to KLH (2018a), in 2017–2018 South Sumatra generated ± 150 tonnes of solid waste daily. Based on its source, solid waste generation in South Sumatra can be classified into seven categories, i.e. householder, industry, offices, traditional market, modern market, public places, and other. In 2017–2018, the householder segment accounted for more than 47% of the solid waste generated in this province. Traditional markets accounted for ± 13%, commercial and institutional sources including stores, business offices, commercial warehouses, hospitals, educational and health care facilities, the military, non-profit research organisations, and government offices, for ± 4.6%. Public places, including roads, parks, rivers and other public places, account for ± 2.5%. These statistics show that the predominant source of solid waste generation in South Sumatra is householders.

Furthermore, although 150 tonnes is already a large amount, some people argue that this figure was probably lower than the reality. First because it only covered eight out of 16 regencies/cities in South Sumatra (KLH, 2018a) and secondly it only included garbage that was sent to the TPA — *Tempat Pembuangan sampah Akhir* or landfill

(KLH, 2018a). According to Ueda and Matsuoka (2016), it was only the officially collected garbage going to the TPA and most garbage generated by households in South Sumatra was not officially collected, due to lack of collection services. If a door-to-door garbage collection service does not exist, people throw their garbage in the TPS — *Tempat Pembuangan Sementara* or temporary landfill, however the presence of TPS is limited. This problem creates unorganised disposal.

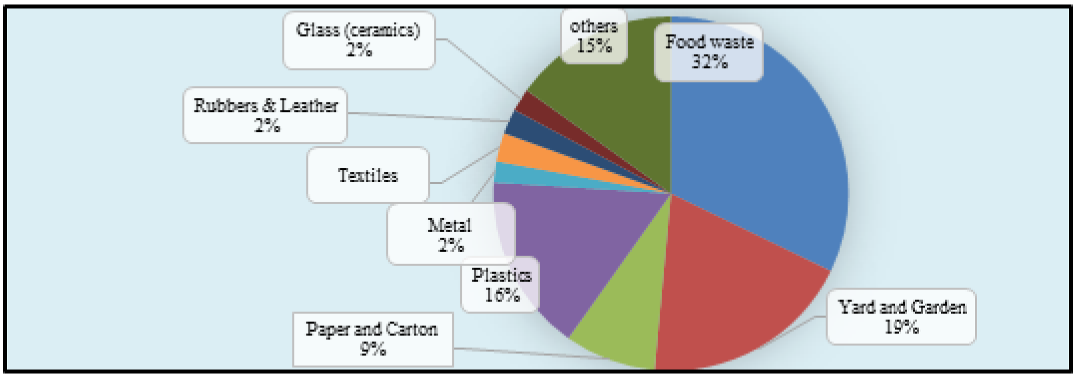
Figure 4.23. Official temporary landfill vs unregistered waste disposal in South Sumatra.
Left is official temporary landfill in *20-Ilir*, Palembang, which is collected on a daily basis.
Right is an open dumping in *Pagar Negara*, Lahat Regency.

Source: Private collection.

The bulk of garbage in unorganised disposal such as described on the right side of Figure 4.23 depends on scavengers or uncoordinated volunteers in the neighbourhood. These volunteers usually clean up the garbage by burning it, which is critical to the creation of smog and pollution in the atmosphere. Furthermore, while surveying households in *Prabumulih*, a city in South Sumatra, in 2014, Ueda and Matsuoka (2016, p. 74) found that households whose garbage was uncollected because of lack of services treated the uncollected garbage by burning or burying, or using it for animal feeding or other purposes.

Regarding its composition, solid waste in South Sumatra tends to be highly organic. As shown in Figure 4.24, the organic material, mostly comes from food waste and yard and garden waste which contribute more than half of South Sumatra's solid waste. Another source of waste that was also dominant was plastics, which equaled as much as 16% (see Figure 4.24).

Figure 4.24. Source of waste in South Sumatra in 2017–2018.



Source: Drawn by the author based on KLH (2018a).

According to Porter (1996), there are at least two important implications for a high proportion of organic materials in the solid waste stream in developing cities. Firstly, solid waste easily rots and stinks, especially in the typically wet, hot climate of South Sumatra, making it more important for aesthetic and health reasons to dispose of it promptly and completely. Secondly, because of its high moisture content, organic waste does not burn well (Porter 1996, p.64). Furthermore, Manfredi, Tonini, Christensen, and Scharff (2009) state that dumping of organic waste directly on an open site directly impacts on the creation of GHG in the form of methane gas (CH_4) which contributes to global warming and climate change.

As in other places in Indonesia, solid waste disposal in South Sumatra ends up in landfill and open dumps. Landfilling is the most common waste disposal method worldwide, and it is recognised as being an option both now and in the future, especially in low and middle-income countries, since it is the easiest and cheapest technology available (Ismail & Manaf, 2013). However, not all regencies/cities in South Sumatra have landfill as their disposal facilities. Table 4.8 shows that South Sumatra has 17 landfills, which are located in eight regencies/cities. Landfills in South Sumatra were categorised as un-managed deep, because the garbage bulks in these landfills exceeded five metres above the groundwater level (Bappeda Provinsi Sumatera Selatan, 2012).

Table 4.8. Final disposal site (TPA) in South Sumatra in based on regency/city and the type of the landfill in 2017–2018.

No	Regency/City	Landfill	Type
1.	OKU	TPA Simpang Kandis (Gn. Meraksa)	Un-managed deep[75]
2.	OKI	TPA Tugumulyo, TPA Kayuagung	Un-managed deep
3.	Muara Enim	TPA Bukit Kancil	Towards semi-aerobic landfill
4.	Lahat	TPA Sukarame (Gumay Talang)	Un-managed deep
5.	Musi Rawas	TPA Simpang Gegas	Un-managed deep
6.	MUBA	TPA Muara Teladan, TPA Sungai Medak	Un-managed deep
7.	Banyuasin	—	In the process of development
8.	OKUS	TPA Desa Bendi	Un-managed deep
9.	OKUT	TPA Martapura	Towards semi-aerobic landfill
10.	Ogan Ilir	TPA Palem Raya, TPA Tanjung Raja	Un-managed deep
11.	Empat Lawang	—	—
12.	Palembang	TPA I Sukawinantan, TPA II Karyajaya	Un-managed deep
13.	Prabumulih	TPA Sungai Menang	Un-managed deep
14.	Pagar Alam	TPA Simpang Padang Karet	Towards semi-aerobic landfill
15	Lubuk Linggau	TPA Lubuk Linggau	Towards semi-aerobic landfill

Source: Prepared by the author based on KLH (2018a).

To some extent, the way South Sumatra's households treat their garbage has not yet reflected environmentally friendly actions. According to BPS (2013a), most of the households manage their garbage by burning it. Garbage combustion does solve the problem of their bulk of garbage at home, but the smoke produced from the combustion will create CO^2 and methane which are very critical to climate change. Another behaviour that is also common is to bury the garbage or dispose of it directly into the sewer/river. In addition, the community's awareness of sorting the garbage at home is still very low. In 2013, more than three-quarters of all households in South Sumatra stated that they had never sorted waste (BPS, 2013a, p. 111).

4.4.4 **The state of environmental disasters**

As a tropical region, South Sumatra has two seasons, wet and dry, however its average daily temperature has been changing over the past 30 years. In 2016, the temperature ranged between 24.2° and 33.9°C (BPS Provinsi Sumatera Selatan, 2017c) with the coldest days in September and December and the hottest days in August. Compared to the temperature 30 years ago, the average temperature was somewhat hotter. For example in 1987, South Sumatra's temperature ranged between 23–33 degrees, with the coldest temperature occurring in January and August of about 23.2°C, and the warmest was in August at almost 34°C (BPS Provinsi Sumatera Selatan, 1988).

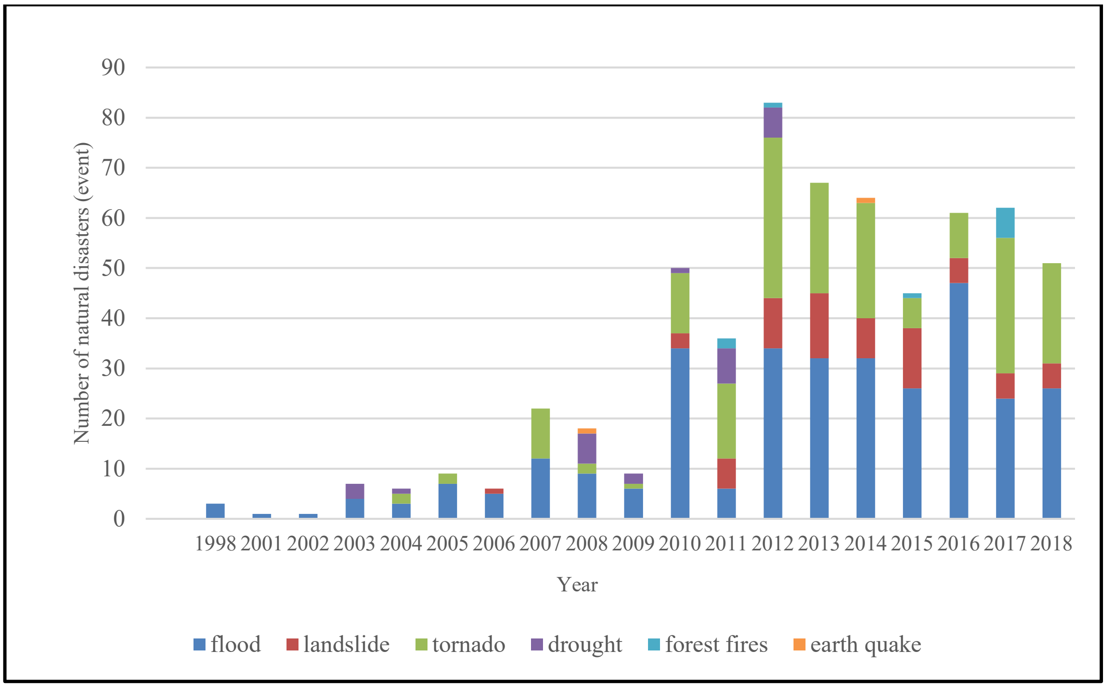
Furthermore, data on temperature for certain months throughout the period 1987 to 2016 showed an increasing trend, especially with respect to the maximum temperature

[75] The height of garbage bulk > 5 m; while the range of ground water springs from the base of the landfill was <3m.

data. For example, the maximum temperature data in January, increased from 29.8°C in 1987 (BPS Provinsi Sumatera Selatan, 1988) to 32.9°C in 2016 (BPS Provinsi Sumatera Selatan, 2017c, p. 13). This increase was larger than the average increase of the earth surface during 1880 to 2012, which according to the IPCC — Intergovernmental Panel on Climate Change was between 0.65 to 1.06°C (IPCC, 2013, p. 5). Nevertheless, the big increase in temperature in 2016 has also occurred all over the world. NASA — National Aeronautics and Space Administration had estimated with greater than 95% certainty, that 2016 was the warmest year on record, and eight of the 12 months that make up the year, including January, were the warmest on record for those respective months (NASA, 2017). This warming must have impacted on natural ecosystems and their provided services.

Research suggests that changes in temperatures have been influenced by growing concentrations of greenhouse gases, which absorb solar radiation and warm the atmosphere (IPCC, 2007, 2013, 2014a). In the long term, global warming and climate change will further exacerbate environmental disasters which sadly are often experienced by South Sumatrans in their daily life. During 1998–2018, *Badan Nasional Penanggulangan Bencana* — BNPB recorded six types of natural disasters, i.e. floods, landslides, tornados, droughts, forest fires and earthquakes that often occur in this area (see Figure 4.25). Of these disasters, floods occurred most frequently. This disaster mostly occurs during the rainy season and happens mainly due to the overflow of residential drains because of poor planning and maintenance or due to disposal of garbage on the riverbanks (Badan Lingkungan Hidup — BLH, 2012). According to BNPB (2018b), during 1998–2017 South Sumatra experienced 285 flood events and they occurred the most in MURA and MUBA regencies (see Table 4.9). During 1998–2017, floods killed hundreds injured thousands of residents. The total number of people who were suffered and needed to be evacuated was even higher (see Table 4.9).

Figure 4.25. Numbers of natural disasters occurring in South Sumatra, 1998–2018.



Source: BNPB (2018b).
Note: 2018 data was up to May 2018.

Table 4.9. Number of flood disaster events and casualties in South Sumatra based on regency/city, 1998–2017.

Area	Numbers of Event	Casualties (Persons)		
		Death/Disappeared	Wounded	Evacuated
OKU	9	0	0	2,460
OKI	24	1	0	33,949
Muara Enim	22	3	1,065	40,736
Lahat	31	170	0	4,991
MURA	33	1	165	49,224
MUBA	26	1	0	90,295
Banyuasin	11	0	0	56,872
OKUS	19	3	5	9,641
OKUT	20	0	0	18,291
OI	15	0	0	86,844
Empat Lawang	16	2	1	12,046
PALI	6	0	0	5,164
Muratara	13	0	0	157,264
Palembang	18	1	0	19,808
Prabumulih	9	1	0	16,324
Pagar Alam	8	24	0	24
Lubuk Linggau	5	0	0	288
South Sumatra	285	207	1,236	604,221

Source: BNPB (2018b).

4.5 Summary

This chapter has discussed that South Sumatra has a large population. It is one of the ten most populous provinces in Indonesia and more populous than Brunei, Timor Leste and Singapore combined. In 2016 the population of South Sumatra was 8.2 million and it is projected to reach 10.6 million in 2045. However, this population is not equally distributed among its regencies/cities. Most of South Sumatra's population is concentrated in Palembang, the capital city, while other regions have relatively sparse populations. This all leads to a critical challenge.

South Sumatra's has been experiencing a large population growth since the 1970s, due to numerous waves of fertility in the early years. Up to now, this province continues to experience a great deal of urbanisation, which impacts on the more urbanised of the population which are also more masculine and more ageing. Furthermore, the population of this province was mostly working in the farming sector and possessing a low level of education. Such population dynamics impacts on the environment.

Currently, South Sumatra's environment has already been under pressure. The state of the environment suggests that to some extent, the population's daily behaviour has been impacting on the forest and water. Furthermore, a lack of proper solid waste management has also contributed to the creation of pollution and greenhouse gases in the atmosphere. In addition, there is also an indication that households have not been acting in an environmentally friendly manner while undertaking their daily necessities. This is a problematic condition because engaging in environmentally friendly behaviour in daily life is crucial for environmental protection.

Making a few small changes to the way we use water, electricity, fossil fuels forest, etc. for our daily needs could make a difference in our environment. In response to the increasing environmental impact driven by human behaviour, previous studies have highlighted the need to have more insights on human environmental behaviour. Next chapter introduces a measure to monitor environmental behaviour in South Sumatra based on primary data collection.

CHAPTER: 5 QUANTIFYING ENVIRONMENTAL BEHAVIOUR WITH FACTOR ANALYSIS

5.1 Introduction

This chapter addresses the third and fourth objectives of this thesis. First, this chapter describes the socioeconomic characteristics of the respondents (heads of selected households or their representatives) from whom information about their environmental behaviour with respect to the main six domains of living have been gathered. These are the results of the household survey, which are discussed later in conjunction with the analysis of EB with respect to demographic and lifestyle variables, Then, this chapter shows how the statistical procedure of Factor Analysis (A. P. Field, 2009; Hair, 2006; Stevens, 1995; Tabachnick & Fidell, 2013) has been applied for constructing the composite Environmental Behaviour Index (EBI) for South Sumatra Province based on an analysis of the primary data collected in the study. Second, it shows how the Alkire-Foster (2011) method has been used for determining the threshold of environmentally friendly behavior based on the two-thirds value of the EBI score.

This chapter is divided into four sections including the present one. The second discusses the respondents' socioeconomic characteristics which are grouped based on their demographic attributes and their lifestyle. The next section discusses the step by step process and the results of factor analysis. The last section gives the summary of the chapter.

5.2 Characteristics of the respondents of the household survey

The characteristics of the respondents are classified into two groups of socioeconomic characteristics; demographic and lifestyle characteristics. The demographic variables include age, household size, sex, marital status, education, employment and migration. Lifestyles variables comprise per capita expenditure, household's expenditure on food and on non-food items, tourism activities, smoking, and access to the internet.

Information about these variables was collected either as primary data during the household data collection or as secondary data from the Susenas of March 2016 conducted in South Sumatra. Thus, information about the demographic variables, except that on migration, was collected during household data collection, while that on migration was taken from matching records of March 2016 Susenas. Similarly, information about all lifestyle variables was obtained from the matching records of the March 2016 Susenas.

5.2.1 **Demographics characteristics**

Table 5.1 provides the data on demographic and lifestyle variables collected in the household survey for the present study.

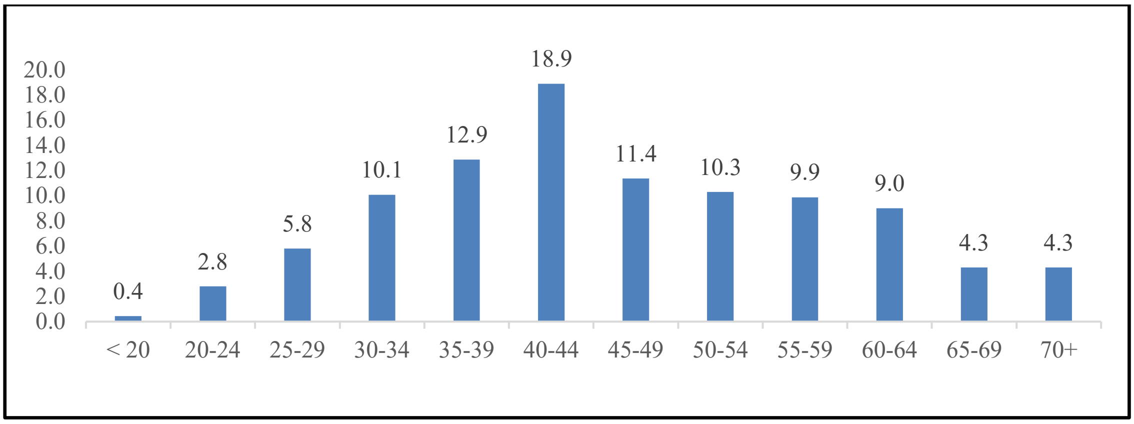
Table 5.1. Demographics characteristics of the respondents — household survey (present study).

Characteristics		Household Survey
1. Age (Years Old)	Median	44.00
2. Sex (%)	Male	50.2
	Female	49.8
3. Marital status (%)	Single	4.5
	Married	81.1
	Divorce	2.6
	Widow	11.8
4. Education (%)	Primary	62.53
	Junior	12.64
	High School	18.85
	University	5.98
5. Employment (%)	Agricultural	60.44
	Non Agricultural	39.56
6. Household size (number of persons per household)	Median	4.00

Sources: Prepared by the author based on household survey from Fieldwork (2016).

The respondents of the present study are aged 18 years and over as required by the study, except when the respondent is married, in which case the respondent could be younger than 18. However, the household survey found no respondents younger than 18, so they are all deemed mature enough to answer the questions. Furthermore, the median age is 44 years old. By grouping the respondents into five year age-groups, the data also reveals that the largest age-groups are located where the median age is located, i.e. group 40–44 years (18.9%) (see Figure 5.1).

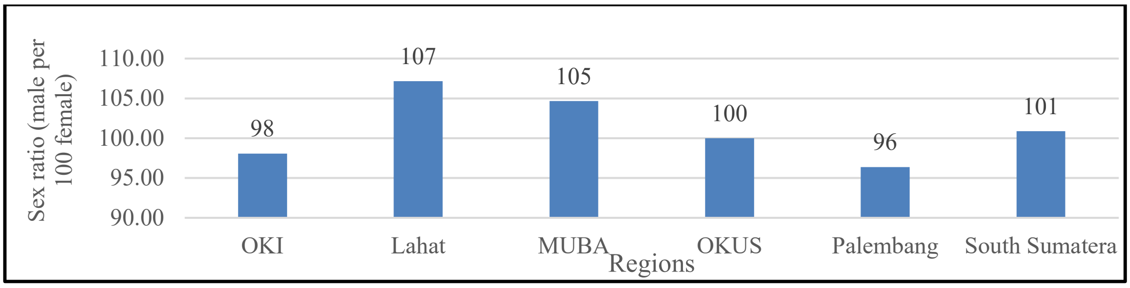
Figure 5.1. Distribution of respondents by age-groups.



Source: Drawn by the author based on household survey from Fieldwork (2016).

Regarding gender, the design of the sample for primary data collection requires an equal number of males and females (see Chapter 3). However, due to the reduce in sample size; it was not possible to have exactly equal numbers of male and female respondents in the household survey. Thus, male respondents comprised 50.2% of the sample, and female respondents 49.8% (Table 5.1) which implies a sex ratio of about 101 males per 100 females. However, as shown in Figure 5.2, the sex ratio varies between the regencies/city, with the highest for Lahat regency (107 males per 100 females) and the lowest for Palembang City (96 males per100 females).

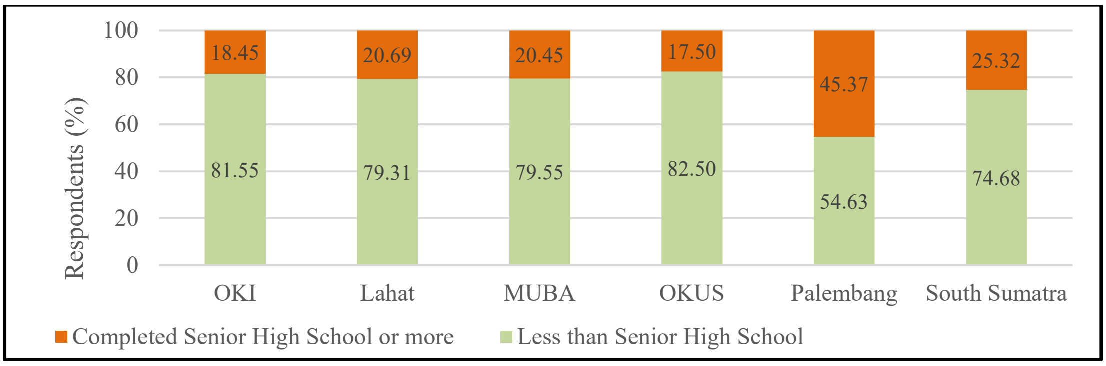
Figure 5.2. Sex ratio of the respondents in the household survey by regency/city.



Source: Drawn by the author based on household survey from Fieldwork (2016).

With respect to education, the majority respondents to the household survey had less than senior high school education. When assessing data by regions, this research found the existence of a significant percentage (around 74-82%) of household survey respondents who did not complete Senior High school (SHS) in OKI, Lahat, MUBA, and OKUS (see Figure 5.3), while in Palembang City, the same indicator accounted only for 54.63%(see Figure 5.3). This indicates that the primary data participants in Palembang city have a relatively higher level of education compared to the other four regions.

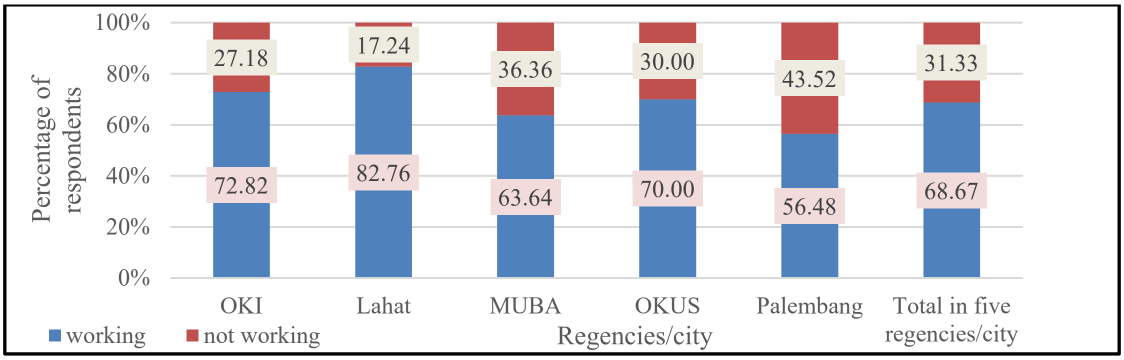
Figure 5.3. Distribution of respondents by educational level in the household survey by regency/city.



Source: Drawn by the author based on household survey from Fieldwork (2016).

Concerning employment, almost 70% of the respondents to the household survey were working (see Figure 5.4.). The decomposition of data between regions shows that the percentage of workers in the five sample regions ranges from 56.48% (Palembang) to 82.76% (Lahat). Furthermore, the household survey shows that most of this working population engage in agricultural sectors (see Table 5.1), which accounted for as much as 60.44% of the respondents that were working.

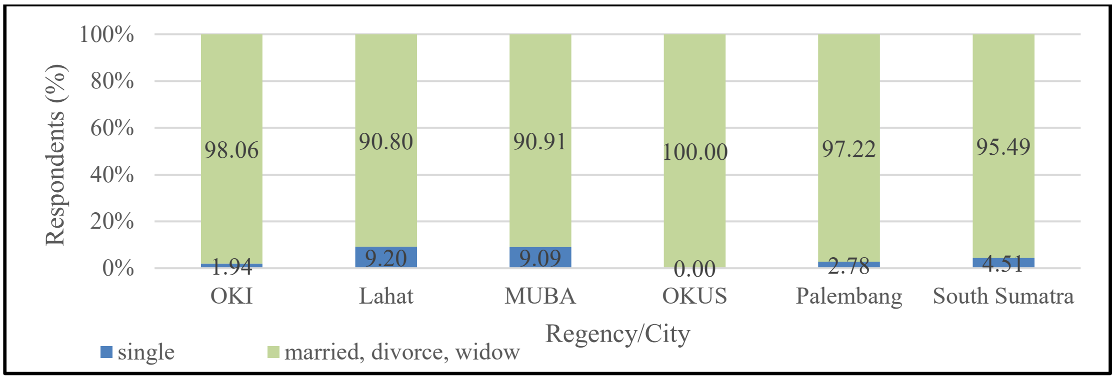
Figure 5.4. Distribution of respondents by regency/city and working status.



Source: Drawn by the author based on the results of the SPSS output of March 2016 Susenas for the respondents that being sampled in the household survey during Fieldwork (2016).

The distribution of the respondents by marital status in the household survey for the present study shows that less than 5% of the sample is single. This is not surprising because the respondents in the present study are mostly aged 18 years and over and acting as the household representative, i.e. the wife or husband, or other member of the household. Likewise, an overwhelming majority of the respondents in each regency/city is ever married (married, divorced or divorced). The proportion of ever married varies between 90.8% in Lahat and 100% in OKUS (Figure 5. 5).

Figure 5.5. Distribution of respondents by marital status in each regency/city.

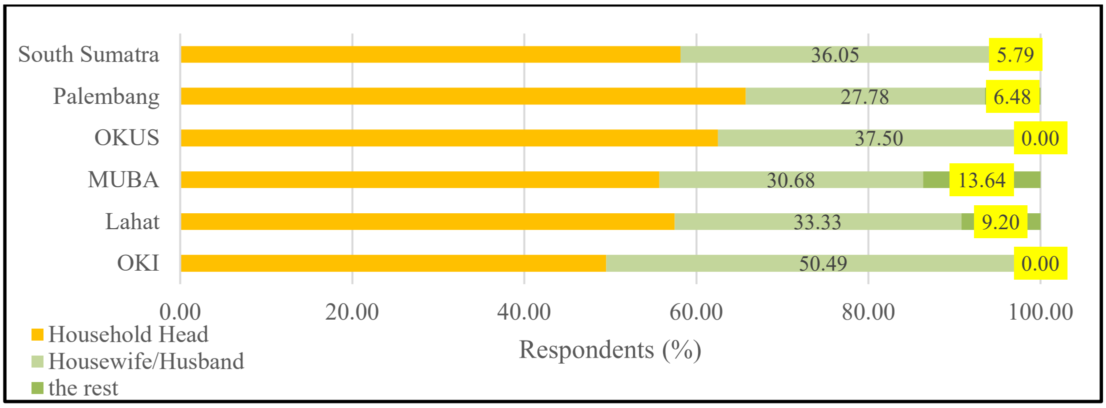


Source: Drawn by the author based on household survey from Fieldwork (2016).

In most regencies/city, the respondent was the household head. However, in order to have equal representation of males and females among the respondents, it was decided to have the wife of the household head answer the questions if the respondent in the immediately preceding household was a male household head. In reality, except for the Regency OKI, the majority of respondents were the household head (see Figure 5.6).

Furthermore, the distribution of the respondents by the size of the household for the present study shows the median size of households was equal to four persons per households) (see Table 5.1).

Figure 5.6. Number of respondents according to their relationship with the household head.



Source: Drawn by the author based on household survey from Fieldwork (2016).

5.2.2 **Lifestyle characteristics**

This section describes respondents based on their lifestyle. These characteristics include expenditure on six groups of variables: household's expenditure on food, and on non-food and per capita expenditure on food and non-food, as well as tourism activities, smoking activities and access to the internet. Information about these variables was been collected from secondary data (Susenas of March 2016).

Table 5.2 presents information related to the respondents' household spending on food and non-food items as well as the per capita expenditure. Data on median expenditure shows that the expenditure for food was bigger than non-food, whereas the indicator per capita expenditure shows that the median of the expenditure per capita of the respondents was around Rp.751,706.

Table 5.2. Expenditure on food and non-food items, South Sumatra 2016.

Characteristics on expenditure on food and non-food		Sample
1. Household's expenditure on food items	Median	1,522,542.86
	Percentile 33.3333	1,204,714.29
	Percentile 66.6666	1,990,714.29
2. Household's expenditure on non-food items	Median	934,983.33
3. Per Capita expenditure on food and non-food items (Rp/month/per person)	Median	751,706.00

Source: Prepared by the author based on Susenas March 2016.

Table 5.3. The respondents based on tourism, smoking and internet activities: South Sumatra 2016.

Activities		Percentage of people engaged in the activity in the matched record
Lifestyle variables: a. Tourism Activities	Travelling in the last 6 months	14.09
b. Smoking Activities	Smoking	37.78
c. Internet Activities	Have internet access	10.55

Source: Prepared by the author based on Susenas March 2016.

Concerning tourism activities and smoking habit, the household survey also has representatives of respondents that can be categorised as smokers (37.78%) and travellers (14.09%). Meanwhile, information on access to the internet shows that

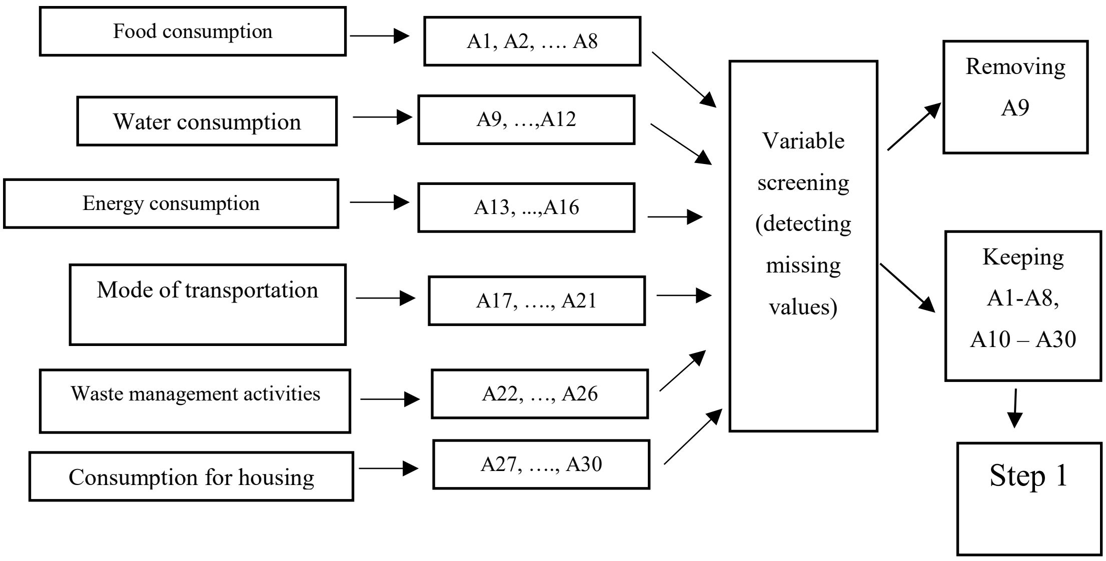
10.6% of the respondents to the household survey have access to the internet (see Table 5.3).

5.3 Measuring environmental behaviour: A step by step description of an Environmental Behaviour Index contruction with factor analysis

An Environmental Behaviour Index (EBI) has been constructed in this study in order to measure people's environmental behaviour. EBI is a composite index based on a number of variables representing six domains of people's environmental behaviour. As described in Chapter 2, these domains are: (i) behaviour regarding consumption of food, (ii) behaviour regarding consumption of water, (iii) behaviour regarding consumption of energy, (iv) behaviour regarding mode of transportation, (v) behaviour regarding waste management, and (vi) behaviour regarding consumption for housing. Altogether, a total of 30 variables was considered as the starting point, for which data were collected during the Household Survey of August to October 2016 (the details of the survey are given in Chapter 3). In this study, an exploratory factor analysis (FA) was run on the data collected by using IBM-SPSS software version 25 (IBM Corp, Released 2017).

However, at first a data screening was done to examine the suitability of the data for factor analysis. First, the data were screened for the presence of missing values, which were identified using the code '6' (inapplicable) in the data sets. This screening revealed that Variable A9 (see Figure 5.7) had the most missing values. This is because variable A9 relates to the use of piped-water in the household, and many households do not have piped-water at home consequently responses to question A9 relating to the variable A9 was 'inapplicable' (code 6). Therefore, variable A9 was removed from the list of variables put through factor analysis.

Figure 5.7. The variable screening process.



Source: Drawn by the author based on Fieldwork (2016).

5.3.1 **Step one: Initial checking**

There is no agreement about the minimum sample size for factor analysis. Hair (2006), does not favour a sample size that is fewer than 50 and recommends that "more than 100 is preferable". Other scholars such as Tabachnick and Fidell (2013) argue that the larger the sample the better it is, because for data sets of small sample sizes the correlation among variables are less reliable and tend to vary from sample to sample. Thus, they recommend 300 as a comfortable number for factor analysis. Similarly, Field (2009) agrees that the minimum ideal sample size for a factor analysis is 300. Consequently, according to the above sources, data collected in the present study with a sample size of 466 satisfy the criterion of a minimum sample size needed for factor analysis.

Chapter 3 Section 3.3 mentioned that not all variables used in the household survey represent environmentally friendly behaviour. There are also some variables representing environmentally unfriendly behaviour. Such answers and the variables they represent are now referred to as variables on a negative scale; conversely the questions eliciting answers that denote environmentally friendly behaviour and the variables they represent are now referred to as variables on a positive scale. As can be seen in Table 5.4, the variables that fall on a negative scale include five variables in the food dimension (A3, A4, A5, A6 and A7), one variable in the energy dimension

(A14), all three variables in the dimension of waste management (A22, A25, A26) and all the variables in the dimension of housing (A27, A28, A29 and A30). A respondent having higher Likert scores in the variables on a negative scale, is categorised as behaving in a more unfriendly manner towards the environment. In contrast, a respondent having higher Likert scores in variables in the positive scale is categorised as behaving in a more friendly manner towards the environment.

In order to make interpretations easy, all the variables considered in this study are assigned in such a way that the higher the score of a variable, the greater (or more positive) a value it holds. Accordingly, all the variables that hold a negative-scale-scoring system have been transformed, so that they also go into positive directions. Table 5.4 explains how we transformed the variables that fall within the negative scale category. In addition, this table also provides the name of the variable after transformation.

Table 5.4. Variable transformation for same direction values (the higher the friendlier).

Dimension	Code of Variable	Scale's Category	Transformation	New Code
Food	A1, A2, A8	Positive	No	—
	A3, A4, A5, A6, A7	Negative	Reversing[76]	TA3, TA4, TA5, TA6, TA7
Water	A10–A12	Positive	No	—
Energy	A13, A15–A16	Positive	No	—
	A14	Negative	Reversing[1]	TA14
Transport	A17–A21	Positive	No	—
Waste management & recycling	A23, A24	Positive	No	—
	A22, A25, A26	Negative	Reversing[1]	TA22, TA25, TA26
Housing	A27, A28, A29, A30	Negative	Reversing & Re-scaling[77]	TA27, TA28, TA29, TA30

Source: Prepared by the author based on household survey from Fieldwork (2016).

5.3.2 **Step two: Variable selection and factors identification**

To get a number of statistically valid factors for the EBI, this research ran factor analysis by several sequential iterations. In every iteration, the variable was checked one by one by considering eight well-recognised criteria (A. P. Field, 2009; Franklin

[76] Score 1 (never) in the original variable is transformed to 5, score 2 (seldom/rarely) in the original variable is transformed to 4, score 3 (occasionally/sometimes) stays the same, score 4 (frequently) in the original variable is transformed to 2, score 5 (every time) in the original variable is transformed to 1 .

[77] Score 1 (yes) in the original variable is transformed to 5, Score 0 (no) in the original variable is transformed to 1.

et al., 1995; Hair, 2006; Stevens, 1995; Tabachnick & Fidell, 2013). (see Chapter 3 Section 3.6).

Generally, factor analysis routine in IBM-SPSS (IBM Corp, Released 2017) has seven extraction techniques for locating the underlying dimension of a data set, i.e. Principal Components (PC), Principal Factor or Principle Axis Factoring (PAF), Image Factoring, Maximum Likelihood Factoring, Alpha Factoring, Unweighted Least Squares and Generalized Least Squares (A. P. Field, 2009; Tabachnick & Fidell, 2013). Of those, this research performed a Principle Axis Factoring (PAF) on 29 variables that have similar directions to each other, i.e. the higher the score the more environment-friendlier they are. PAF is selected because this researcher believes that there are latent variables underlying the variables being measured. These latent variables act as the constructs underlying the environmental behaviour questions therefore this study ran factor analysis with PAF, to check whether or not the variables within the same dimension do 'hang together'. That is, we wish to determine empirically whether responses from participants to the food consumption questions are more similar to each other than their reactions to the water consumption items, and so on. Conducting PAF can assist in validating the data, whether or not the data fit into the six constructs that we believe exist or whether there are other constructs that better explain the data. As such, by adopting PAF, we 'allow' the factor analysis to find constructs/ factors that best fit the data, even if this deviates from the original predictions.

At the first iteration, all 29 variables were taken into the factor analysis. The first criterion, the Pearson Correlation shows that there are five variables (TA3, A13. A15, A16, A24) which do not correlate fairly with each other, because the correlation coefficient is less than 0.3. Therefore, these five variables have been deleted from any further analysis as suggested by Field (2009, p. 648).

Further investigation of the Pearson Correlation also shows that two variables i.e. A18 and A21 hold a 'perfect' correlation (Pearson Coefficients are more than 0.8). According to Field (2009, p. 648) the presence of 'perfect' correlation indicates the presence of multicollinearity. Multicollinearity is a problem in factor analysis, because it is impossible to determine the unique contribution to a phenomenon of variables that are highly correlated. The indication of a multicollinearity can also be seen from the value of the determinant. The determinant resulted from the first iteration is very close to zero.

According to Tabachnick and Fidell (2013), in the presence of multicollinearity between two variables, one of the two variables should be deleted from the analysis. Simulations were therefore undertaken to decide which of the two variables (A18 or A21) should be deleted from the factor analysis.

At the second iteration, two trials were done. First, all these five variables with low Pearson Coefficients (i.e., less than 0.3) were deleted, then the variable A18 was deleted as it is one of two variables with very high Pearson Correlation coefficients (i.e., more than 0.8). Following this, the second trial was done by deleting all five variables mentioned above plus and the variable A21, which was the other variable that possessed very high correlation. After comparing several indicators from the SPSS output of the factor analysis, i.e. the determinant, the Bartlett Test, the KMO — The Kaiser-Meyer-Olkin and the variance explained by the factor, it was decided to keep the variable A18 and delete the variable A21. Variables TA3, A13, A15, A16, A24 and A21 were therefore deleted from factor analysis. Then all the criteria were re-checked one by one.

The second iteration (i.e., by deleting TA3, A13, A15, A16, A24 and A21) produced a determinant with the value 0.002, which is considered different from zero (A. P. Field, 2009, p. 657). The other criterion, Bartlett's test was also statistically significant, which supports the presence of factorability within the factor analysis. The next criterion, sampling adequacy showed that the KMO test (0.671) also suited to factor analysis. According to Field (2009, p. 647), the lowest KMO for factor analysis is 0.5. This second iteration holds a KMO in the area of 'mediocre', as it is located between 0.5–0.7.

Furthermore, the Kaiser's Criterion on the SPSS output after the second iteration suggested that all the remaining variables can be grouped into seven factors. This criterion recommended retaining all factors with Eigen Values greater than one (Field, 2009, p. 640). Moreover, the total variance that can be explained by the Eigen Values from these seven factors was 60.103%. However, since previous readings suggest not to depend on one criterion alone, it was decided also to check the number of factors suggested by the scree-plot. But it was found the scree-graphics did not provide a visible picture. Therefore, another statistical test, parallel analysis (Franklin et al., 1995) was conducted. Results from the parallel analysis supported the inclusion of seven factors. However, after investigating the Pattern Matrix, it was found that the variable TA7 had a loading factor below 0.3, indicating that the unique contribution of TA7 to its factor is very low. Hence, a third iteration was done by deleting the variable TA7.

At the third iteration, all criteria provided by the SPSS output were re-investigated; however, as it is shown in Table 5.5, we did not get the optimal results in the third iteration, nor at the fourth to the tenth iteration.

Table 5.5. Lists of variables deleted at each iteration.

Stages	Variables		Reasons
	Code	Name	
Data screening	A9	Checking leaks (piped water)	Missing values
Iteration 1	TA3	Consuming imported food	Pearson's coefficient < 0.3
	A13	Turning off electronic devices when they are not in used	
	A15	Covering the pot/pan while cooking	
	A16	Using energy-saving bulbs	
	A24	Composting	
	A21	Conducting emission test routinely	Pearson's coefficient > 0.8
Iteration 2	TA7	Consuming mineral water/bottled water	Pattern matrix < 0.3
Iteration 3	TA5	Consuming beef	Pattern matrix < 0.3
Iteration 4	TA30	separating bins for organic/inorganic waste	MSA[78] < 0.5
Iteration 5	A8	Consuming home-grown food	is located in two factors/dimensions[79]
Iteration 6	Change into 6 Factors	—	Following a suggestion from parallel analysis
Iteration 7	TA 26, 6 Factors	Burning the garbage	is located in two factors/dimensions
Iteration 8	A23, 6 Factors	Sorting the garbage at home	Pearson correlation is less than 0.3
Iteration 9	TA28, 6 Factors	Having infiltration trenches, or biopore infiltration holes, or garden/turf in the home environment	MSA is less than 0.5
Iteration 10	TA28, 5 Factors	—	Eigen values more than 1 were only located in 5 factors
Iteration 11	TA29, 5 Factors	Planting perennials/annual plants	Pearson correlation is less than 0.3

Source: Prepared by the author based on household survey from Fieldwork (2016).

[78] MSA refers to the measure of sampling adequacy. The MSA of a variable is displayed on the diagonal of its anti-image correlation matrix (see A. P. Field, 2009). According to Hair (2006) MSA must exceed 0.5 for both the overall test and each individual variable.

[79] The SPSS output of pattern matrix in this iteration shows that A8 were emerged into two dimensions.

Following the process of investigation stated in Figure 3.16 (see Chapter 3) is was found that all the requirements for the analysis were met after the 11th iteration was completed. During each iteration, any variable that did not meet the criteria was deleted from the dataset. In detail, Table 5.5 provides information about all variables that were removed during the process of variables selection.

Factor analysis conducted in this study produced the optimum variable selection at the 11^{th} iteration, which resulted in the retention of 15 of the 29 initial variables for constructing the Environmental Behaviour Index (EBI). Based on factor analysis, these 15 variables were grouped into five dimensions, which together explain 63.6% of the total variance (see Table 5.6). This implies that five of the initial six dimensions are sufficient to explain variations in the environmental behaviour of the people of South Sumatra.

The next step is to label the five dimensions identified above. It was decided to name these dimensions by investigating the characteristics of variables forming the dimensions. The first dimension consists of four variables, A18 (using a low carbon fuel, i.e., using the brands Pertamax/Pertalite rather than Premium for vehicle fuel), A20 (conducting routine machine checks), A19 (reducing private transport), and A17 (using public transport). This dimension is henceforth named transportation behaviour.

The second dimension consists of three variables, A11 (saving water while cooking), A10 (having shorter shower) and A12 (re-using grey water). This dimension is identified as behaviour related to water efficiency.

The third dimension consists of four variables — A2 (consuming vegetable or fruits), A1 (consuming local or traditional food), TA4 (the transformed variable A4 i.e., consuming chicken) and TA6 (the transformed variable A6 i.e., consuming fish/seafood). This dimension is named the dimension of food behaviour.

The fourth dimension consists of two variables, TA22 (transformed variable A22 — littering) and TA25 (transformed variable A25 — dropping waste in the river or the waterways). This dimension is labelled the dimension of littering and disposing waste in the river.

The fifth and last dimension consists of two variables — TA14 (the transformed variable A14 — using firewood for cooking) and TA27 (the transformed variable A27 — having toilet with a septic-tank). This dimension is referred to as the dimension of use of firewood and toilet.

The names of the new dimensions and their constituent variables are illustrated in Table 5.6.

Table 5.6. Variable codes, variable names, loading factors, total variance explained and the new factors/dimensions.

No.	Redefined dimensions	Variables	Code	Loading factors	Total variance explained	The new dimensions
1.	Transportation	Using a lower carbon fuel (Pertamax/Pertalite other than premium)	A18	0.933	20.038	Transport-friendly
		Maintaining vehicle's machinery service	A20	0.832		
		Reducing the use of private transport	A19	0.775		
		Using public transport	A17	0.515		
2.	Water Efficiency	Using minimal water in the kitchen	A11	0.934	13.866	Water efficiency
		Having a shorter shower	A10	0.716		
		Re-using grey water (from washing vegetable/fruit/rice, ablutions, etc.)	A12	0.404		
3.	Food	Consuming fruit /vegetables	A2	−0.667	12.517	Food-friendly
		Consuming local/traditional food	A1	−0.514		
		Consuming chicken	TA4	0.492		
		Consuming fish	TA6	0.482		
4.	Littering and disposing of waste in the river	Littering	TA22	0.757	9.700	Littering-related activities
		Dumping the garbage directly into drain/river	TA25	0.497		
5.	Use of firewood and toilet	Using a higher carbon content of fuel for cooking (firewood)	TA14	0.683	7.489	Firewood and toilet - friendly
		Having a toilet with septic-tank	TA27	0.444		
				Total	63.609	

Source: Prepared by the author based on household survey from Fieldwork (2016).

5.3.3 **Step three: Variable transformation**

After factor analysis, the next step is categorising the respondents to see whether or not they have been performing a friendly behaviour in a given variable. This research did the categorisation by transforming the score of a selected variable into binary form, zero and one, where the score of 0 (zero) refers to unfriendly behaviour and the score of 1 (one) denotes friendly behaviour.

The transformation is done by considering the nature of the variable. For a positive direction variable, for example variable A18, a respondent is considered as ‘friendly’ if this respondent is at least using a lower fossil fuel occasionally or sometimes. This means, if the answer given by the respondent to question A18 is either 3 (occasionally), 4 (frequently), or 5 (every time), then the respondent is considered to be ‘friendly’. Similarly, transformations are done to other positive direction variables (see Table 5.4). The details of variable transformation are given in Table 5.7.

Table 5.7. Transformation of selected variables.

The new dimensions		Variables		Scale	
				Before Transformation	After Transformation
1.	Transport-friendly	1. 2 3 4.	A18 (using a lower carbon fuel (Pertamax/Pertalite) A20 (maintaining vehicle’s machinery service) A19 (reducing the use of private transport) A17 (using public transport)	1 = Never 2 = Seldom/rarely 3 = Occasionally/sometimes 4 = Frequently 5 = Every time	1,2 = 0 (unfriendly) 3,4,5 = 1 (friendly)
2.	Water efficiency	1 2 3	A11 (saving water while cooking) A10 (having shorter shower) A12 (re-using grey water)	1 = Never 2 = Seldom/rarely 3 = Occasionally/sometimes 4 = Frequently 5 = Every Time	1,2 = 0 (unfriendly) 3,4,5 = 1 (friendly)
3	Food-friendly	1 2	A2 (consuming vegetable or fruit) A1 (consuming local or traditional food)	1 = Never 2 = Seldom/rarely 3 = Occasionally/sometimes 4 = Frequently 5 = Every Time	1,2 = 0 (unfriendly) 3,4,5 = 1 (friendly)
		3 4	TA4 (consuming chicken TA6 (consuming fish/seafood)	1 = Every time 2 = Frequently 3 = Occasionally/sometimes 4 = Seldom/rarely 5 = Never	1,2,3= 0 (unfriendly) 4,5 = 1 (friendly)
4	Littering-related activities	1 2	TA22 (littering) TA25 (dropping waste to the river or waterways)	1 = Every time 2 = Frequently 3 = Occasionally/sometimes 4 = Seldom/rarely 5 = Never	1,2,3= 0 (unfriendly) 4,5 = 1 (friendly)
5.	Firewood and toilet - friendly	1	TA14 (using firewood)	1 = Every time 2 = Frequently 3 = Occasionally/sometimes 4 = Seldom/rarely 5 = Never	1,2,3= 0 (unfriendly) 4,5 = 1 (friendly)
		2	TA27 (having a friendly toilet)	1 = No 5 = Yes	1 = 0 (unfriendly) 5 = 1 (friendly)

Source: Prepared by the author based on Fieldwork (2016).

5.3.4 **Step Four: Calculating the weights**

The next step is measuring the 'weight' of each variable for EBI measurement. This has been done by adopting a method introduced by BPS — Statistics Indonesia while constructing the social capital index (BPS, 2010d). This research calculates the weight by considering the 'total variance after rotation' and the 'loading factor'. Table 5.8 provides the process of measuring the weight and the standardising weight for the variables.

Table 5.8. Selected variables, its factors/dimension, total variance explained, loading factors and its weight.

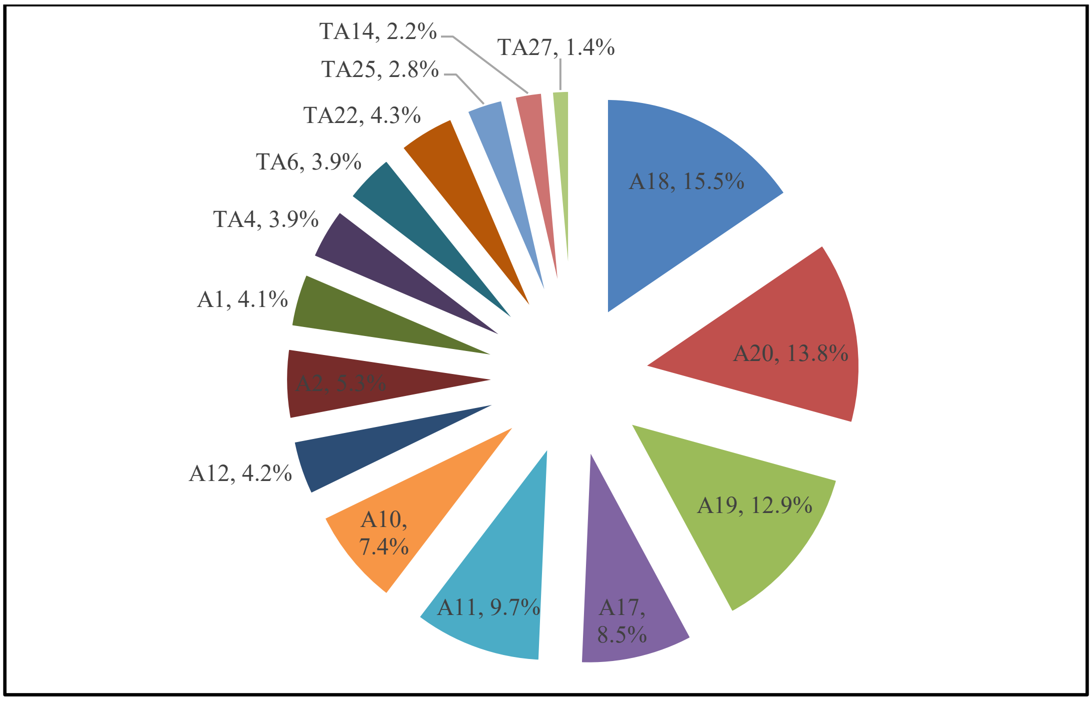
Selected variable	Redefined dimensions	Percentage of total variance explained	Percentage of total variance explained after rotation = A	Loading factors = B	Weight (C) C_i= (ABS (A_i) x B_i)/ 100	Standardised weight (W) W= $C_i/\sum C_i$
1. A18	Transport-friendly	20.04	17.80	0.933	0.166	0.155
2. A20				0.832	0.148	0.138
3. A19				0.775	0.138	0.129
4. A17				0.515	0.092	0.085
5. A 11	Water efficiency	13.87	11.15	0.934	0.104	0.097
6. A10				0.716	0.080	0.074
7. A12				0.404	0.045	0.042
8. A2	Food-friendly	12.52	8.59	−0.667	0.057	0.053
9. A1				−0.514	0.044	0.041
10. TA4				0.492	0.042	0.039
11. TA6				0.482	0.041	0.039
11. TA22	Littering and disposing of waste in the river	9.70	6.13	0.757	0.046	0.043
12. TA25				0.497	0.030	0.028
13. TA14	Firewood and toilet - friendly	7.49	3.43	0.683	0.023	0.022
14. TA27				0.444	0.015	0.014
Total		63.61			1.073	1.000

Source: Prepared by the author based on household survey from Fieldwork (2016).

This research calculated two types of weights. First is the unstandardised weight and second the standardised weight. The standardised weights make it easy to interpret the results and makes comparison between weights valid. The formula for calculating the unstandardised and standardised weights are shown in the table headings of Table 5.8.

The standardised weights also indicate the contribution of each variable to the EBI when every other variable is held constant. For example, the standardised weights shown in Table 5.8, show that the variable A18 contributes most to EBI, because its standardised weight, 0.155, is larger than the standardised weight of any other variable shown. This variable is followed closely by variables A20 and A19 with standardised weights of 0.138 and 0.129 respectively. The four variables in this redefined domain, transport behaviour, together contribute a little over 50% to the environmental behaviour index.

Figure 5.8. Contribution of selected variables to the EBI.



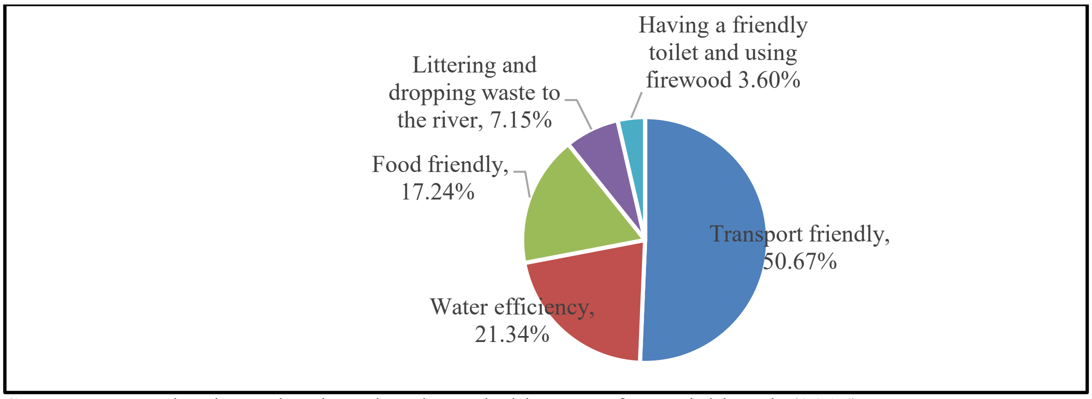
Source: Drawn by the author based on household survey from Fieldwork (2016).

Placing the standardised weights into a pie chart makes it easier to understand the contribution of each of the selected variables to EBI (see Figure 5.8). The figure shows that A18 has the largest slice of the pie, which implies that it is the most critical variable to describe the EBI in this case study. The standardised weight of A18 is equal to 0.155, which means that a one-point increase in A18 will increase EBI by about 15.5%, if the other variables are held constant.

Among all the selected variables forming the EBI, variable TA27 has the least contribution which implies that TA27 describes the EBI in the case study the very least.

If we look at the dimensions, Figure 5.9 shows that the factor contributing the most to the creation of the EBI is the transportation dimension. This is because the total value of the standardised weight of variables that construct this factor is the highest. As we can see in Figure 5.9, the standardised weight of the transportation dimension is equal to 50.67% which implies that one-point increases of the transport-friendly dimension will increase EBI about 50.67%, if the other factors are constant.

Figure 5.9. Contribution of each domain to the EBI.



Source: Drawn by the author based on household survey from Fieldwork (2016).

5.3.5 **Step five: Calculating the EBI**

This the last step in calculating the EBI. The EBI is calculated at each level based on the formula stated in Chapter 3 at Section 3.6.

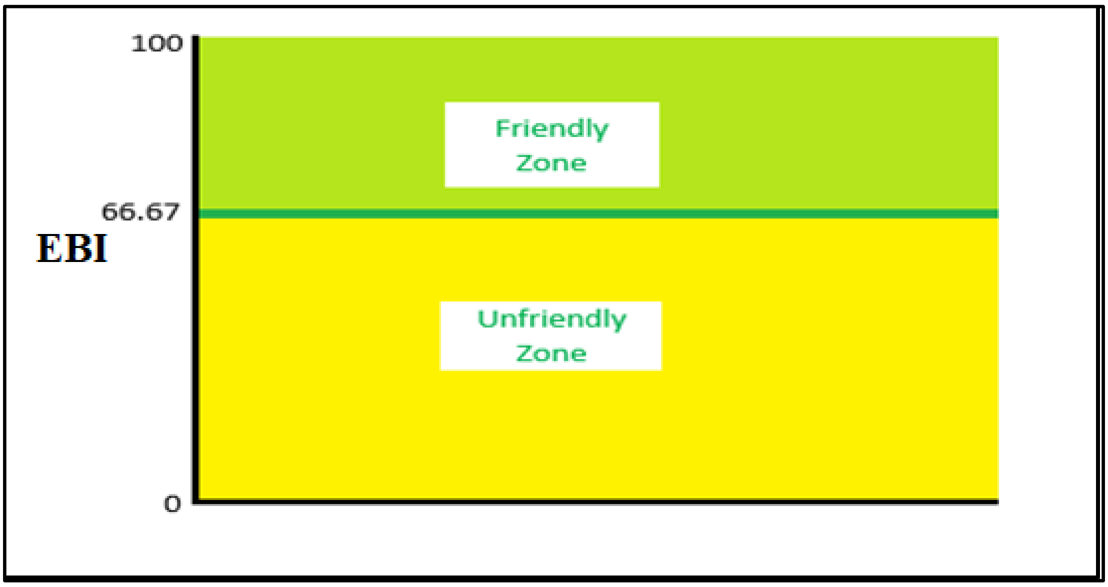
5.3.6 **Step six: Setting benchmarks for the EBI**

The value of EBI ranges from 0 to 100, 0 denoting the least friendly environmental behaviour and 100 denoting the most friendly environmental behaviour.

At all the micro, meso and macro levels perfectly friendly environmental behaviour occurs if a respondent performs in a perfectly friendly manner in all given variables. However, a perfectly friendly environmental behaviour at any level is very hard to achieve.

To help interpret the EBI, in this research it is proposed to use a limit, an environmentally friendly line, known here as the friendliness line. This line is a cut-off point above which any value of the EBI indicates environmentally friendly behaviour. This friendliness line sits at two-thirds of the distance between the minimum and maximum values of the EBI. Thus, in the present case where the EBI lies between 0 (zero) and 100, the friendliness line would be where the EBI is 66.67, i.e. two-thirds of the distance between 0 and 100. The concept of the two-thirds rule is borrowed from Alkire and Foster (2011), who used it to define human well-being by means of a well-being index which lies between 0 and 1. The categorisation of this friendly vs. unfriendly EBI is illustrated in Figure 5.10.

Figure 5.10. The friendliness line.



Source: Drawn by the author.

5.4 Summary

This chapter discusses the socioeconomic characteristics of the respondents of the household survey that took place in five selected regencies/city of South Sumatra, i.e. Lahat, OKI, OKUS and MUBA and Palembang. This chapter discusses how respondents of the household survey have represented a wide variety of South Sumatrans in terms demographic (age, sex, marital status, education, employment and household size) and lifestyles characteristics (food and non-food expenditure; and tourism, smoking and internet activities).

This study opens the door to the understanding of environmental behaviour in an Indonesian context and this chapters aims to introduce the EBI, an indicator to track the state of environmental behaviour in the case of study. This index values from 0 to 100. The bigger the index means the friendlier are the respondents to the environment.

To capture the multidimensional nature of the EBI, this research uses multidimensional variables and adopts multi-steps analysis. These steps range from variables checking up to the index calculation. All steps of the analysis were done by using IBM-SPSS version 25 (IBM Corp, Released 2017) by adopting factor analysis and then classify the EBI by adopting two-third rule (Alkire and Foster, 2011). This thesis started factor analysis with 30 variables to construct the Environmental Behaviour Index (EBI). However, after 11 iteration, this method suggested that this study constructs the EBI based on five dimensions which were formed out 15 variables. These five dimensions include: transport-friendly behaviour; water efficiency; food-friendly; littering-related activities; and firewood & toilet friendly behaviour. Out of five dimensions constructing the EBI, this chapter reveals that the highest contributor to the EBI is transport-friendly behaviour. This dimension contributes more than 50% to the creation of the EBI. Whereas the activities related to littering contributes the least (0.07%) (see Figure 5.9).

The next chapter discusses the analysis of the EBI of South Sumatra at micro, meso and macro level.

CHAPTER: 6 A DISCUSSION OF EBI AT MACRO, MESO AND MICRO LEVEL: A CASE STUDY OF SOUTH SUMATRA PROVINCE

6.1 Introduction

The construction and categorisation of the Environmental Behaviour Index (EBI) has been explained in the previous chapter. The present chapter seeks to analyse and interpret findings related to objective three and four of the thesis, by discussing the EBI at micro, meso and macro levels.

To achieve the above objective, this chapter is divided into four sections. The first section is introductory in nature. The second section describes the profile of environmental behaviour of the people of South Sumatra at the household level (micro level), dimension level (meso level) and province level (macro level). The third section discusses the gap in environmental unfriendliness gap (like the poverty gap) and the severity of unfriendliness. The fourth and final section provides the conclusion and limitations of the analysis carried out in this chapter.

6.2 The EBI of the respondents

The EBI is an index that indicates the state of daily household behaviour related to various dimensions of the environment. In this thesis, this index has been constructed as a composite measure based on 30 variables related to environmental behaviour. Data on these 30 variables were collected from a statistically selected sample of households throughout South Sumatra (known in this thesis as HS — household survey 2016) through fieldwork conducted during August to October 2016. These 30 variables are derived from six dimensions of household daily consumption and garbage disposal activities, including consumption of food, transport, water, energy and housing and waste disposal, which together comprise the main elements in the calculation of the ecological footprint pioneered by Wackernagel and Rees (1998).

This subsection investigates the magnitude of EBI at micro, meso and macro level.

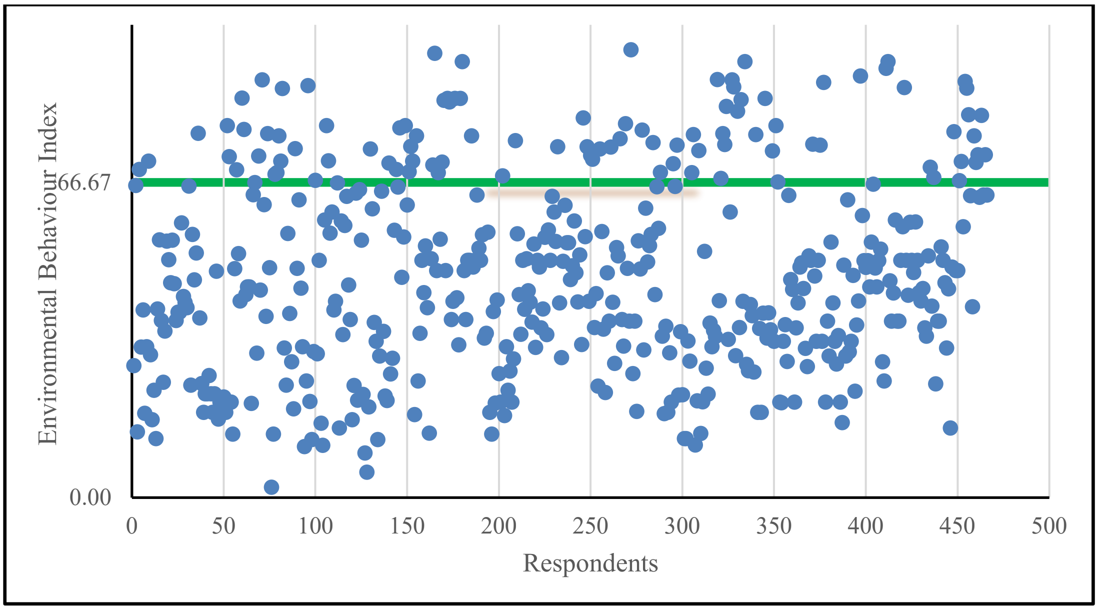
6.2.1 EBI at the micro level

The micro level EBI refers to the performance of environmental behaviour of each respondent of this study. The EBIs of the 466 respondents are shown in Figure 6.1.

These micro level EBIs reveal that the EBI of the all respondents in this case study ranges from 2.18 to 94.73, which is considerably disperse. This implies that there are some respondents holding a very poor level of friendliness (very close to zero), however there are also some others who possess an 'almost perfect' level of friendliness (EBI very close to 100).

Moreover, Figure 6.1 describes the distribution of the 466 respondents based on their EBI level. The Y-bar refers to the EBI level, and the X-bar refers to the respondent. The green line refers to the value of the EBI equal to 66.67, which is two-thirds of the way from 0 to 100. This green line symbolises the friendliness line. As can be seen from Figure 6.1 showing micro level EBI scores, are much larger number of respondents fall below the friendliness line, indicating that an overwhelming number of respondents are 'unfriendly' towards the environment.

Figure 6.1. EBI at the micro level — EBI for each individual.



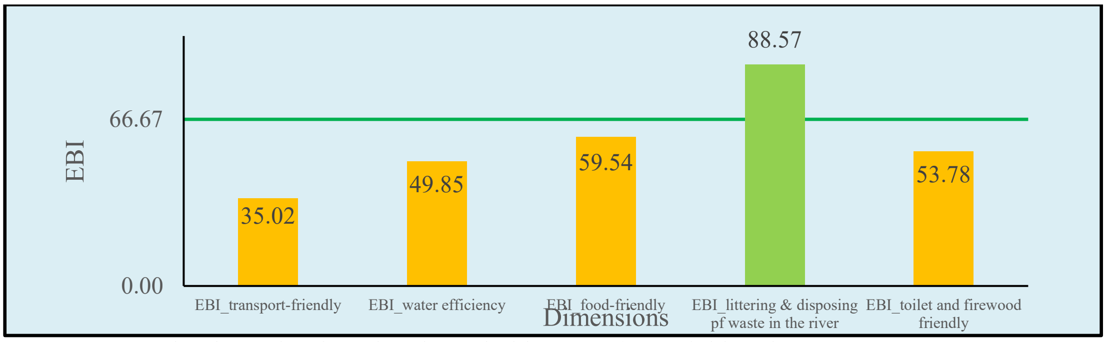
Source: Drawn by the author based on household survey from Fieldwork (2016).

6.2.2 **The meso level results**

The meso level EBI refers to people's environmental behaviour in each of the five dimensions. It should be noted that the study originally started examining people's environmental behaviour on six dimensions comprising 30 variables, but after putting the data through factor analysis, the number of variables was reduced to 15 and the number of dimensions to five (see Section 5.3 in Chapter 5). While 13 of these 15 factors neatly correspond to one of the four dimensions, transport, water, food and waste (littering), the remaining two factors, use of firewood (from the dimension of energy use) and having a toilet in the house with septic-tank (from the dimension on housing) form a hybrid dimension called here 'toilet and firewood friendly'. One could argue that these two factors could be treated as individual dimensions on their own (i.e., energy and housing respectively), however, previous reading mostly retains a dimension with at least two variables in it. According to Osborne and Costello (2009) a dimension will be more stable if it has at least have three items in it. However, Worthington and Whittaker (2006) suggested that researchers should retain a dimension only if they can interpret it in a meaningful way no matter how solid the evidence for its retention based on the empirical criteria. Further, they also argue that it is possible to retain a dimension with only two variables if the variables are highly correlated and relatively uncorrelated with other variables. Previous studies have often retained dimensions that only included two variables, for example Yoo and Donthu (2001) who developed a scale with four dimensions (processing speed [two variables], ease of use [two variables], security [two variables], and aesthetic design [three variables]). In addition, while developing a social capital index, BPS (2010d) retained four dimensions (trust the apparatus and communities [three variables], religious and ethnic tolerance [three variables], trust the neighbor [two variables], communities [two variables], networking [two variables], friendship [two variables]).

The measurement at meso level shows that the EBIs of the five dimensions range from 35.02 to 88.57 (see Figure 6.2). This shows a great deal of variation in the EBI. The lowest value of EBI, i.e., 35.02 lies in the 'unfriendly' zone, while the highest EBI level, i.e., 88.07, is located in the 'friendly-zone'. Figure 6.2 shows that there are four dimensions altogether, namely transport-friendly, water efficiency, food-friendly and firewood and toilet friendly in which people are environmentally not-friendly.

Figure 6.2. EBI based on dimensions.

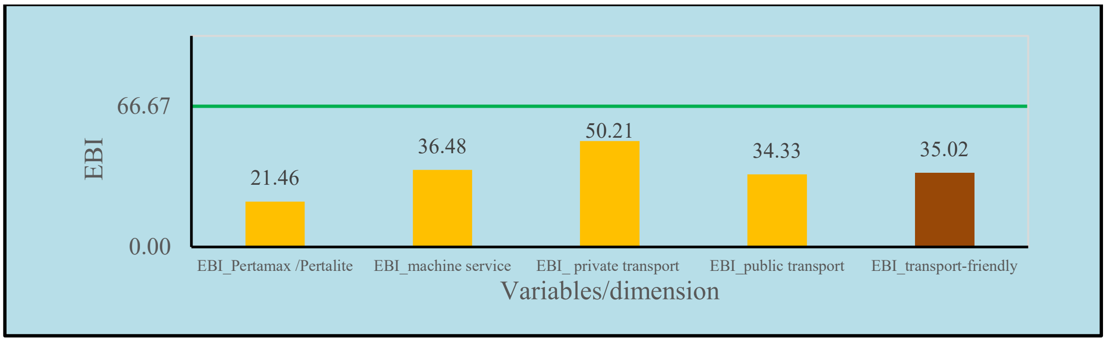


Source: Drawn by the author based on household survey from Fieldwork (2016).

6.2.2.1 ***The dimension with the lowest EBI — transport***

Of the four dimensions in which people have exhibited environmentally not-friendly behaviour as shown in Figure 6.3, the dimension in which the people have shown the least environmentally friendly behaviour is transport, with an EBI value of 35.02. This dimension ended up with four variables after factor analysis, namely (i) the use of less polluting fuels such as Pertamax or Pertalite, (ii) regular servicing of machinery, (iii) use of private transport and (iv) use of public transport.

Figure 6.3. EBI in the dimension of transport and its constituent variables.



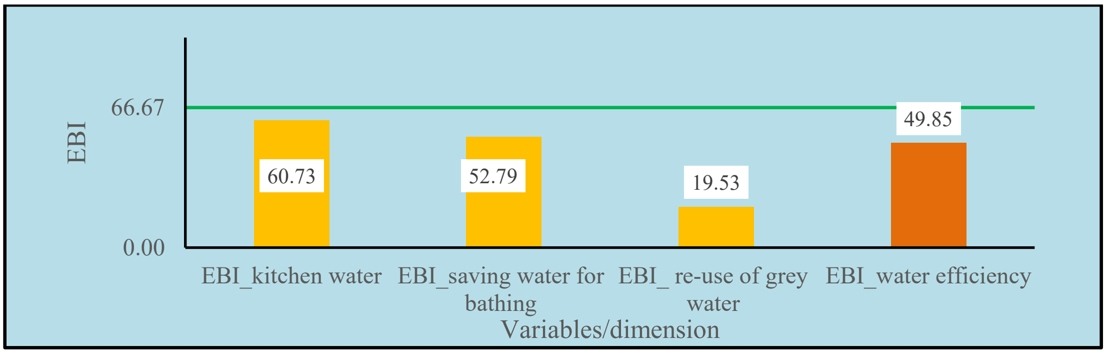
Source: Drawn by the author based on household survey from Fieldwork (2016).

The EBI value shows a large variation among these variables, with the lowest value of 21.46 for the Pertamax or Pertalite variable and the highest value of 50.21 for the private transport variable, but Figure 6.3 shows that they are all below the threshold of 66.67 used as the cut-off value dividing environmentally friendly and environmentally not-friendly behaviour. This shows that the people of South Sumatra, as represented by the sample surveyed in this research are not-friendly to the environment with respect to all aspects of the dimension on transport.

6.2.2.2 ***The dimension with the second lowest EBI — water***

The dimension on water shows the second lowest environmental behaviour index of the people with an EBI value of 49.85, which is 17.62 points below the threshold of environmentally friendly behaviour (see Figure 6.4).

Figure 6.4. EBI in the dimension on water and its constituent variables.



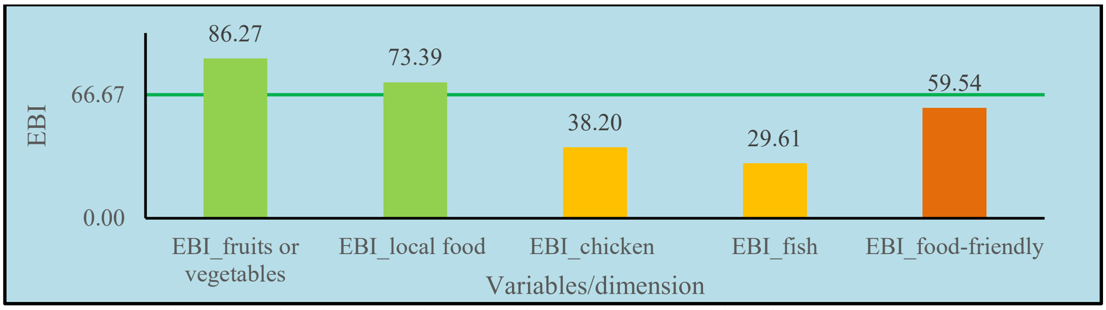
Source: Drawn by the author based on household survey from Fieldwork (2016).

The dimension on water has three variables — (i) the use of kitchen water, (ii) behaviour with bath water, and (iii) reuse of grey water. Figure 6.4 shows that people display environmentally unfriendly behaviour on all three variables in the dimension on water. It is notable that the concept of using grey water is still to become popular is South Sumatra as the EBI for this variable is only 19.53. However, since the other two variables have higher contributions to the overall EBI of the water dimension, the efficiency of water use in South Sumatra is not too far from the friendliness line with respect to water use.

6.2.2.3 ***Environmental behaviour with respect to food***

The domain on food is the domain with the second highest EBI with a value of 59.54, which is only 7.13 points short of being an environmentally friendly domain. The reason for this shortfall is that although two variables of this domain, namely consuming fruits and vegetable and consuming local food have EBI values of 86.27 and 73.39 respectively, which are well above the two-thirds cut-off of 66.67 to be environmentally friendly, the other two variables, consuming chicken and consuming fish have much lower EBI with values of 38.20 and 29.61 respectively (see Figure 6.5). This means that the people of South Sumatra need to be encouraged to eat chicken and fish in moderation.

Figure 6.5. EBI on Food and its constituent variables.

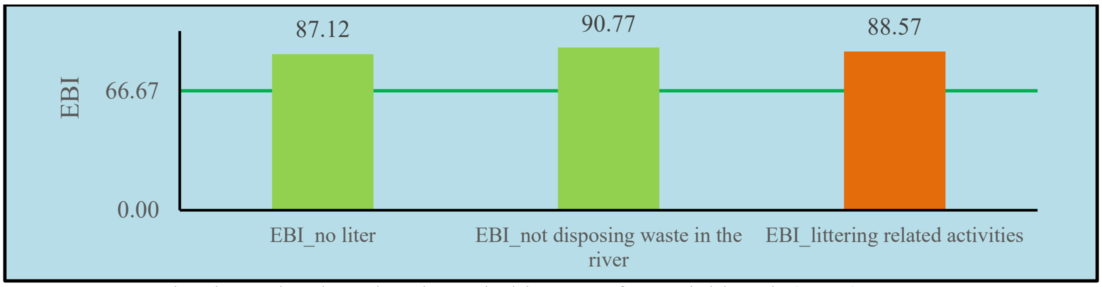


Source: Drawn by the author based on household survey from Fieldwork (2016).

6.2.2.4 *The environmentally friendly dimension: Littering-related activities*

Of the five domains finally considered in this study that on waste disposal (or littering activities) is the only environmentally friendly domain according to the adopted definition. The EBI for this dimension is 88.57, which is just 11.43 points short of being perfectly friendly. This domain has two constituent variables: (i) no littering, and (ii) not disposing of waste in the river, in both of these people have displayed environmentally friendly behaviour with EBIs of 87.12 and 90.77 respectively (see Figure 6.6).

Figure 6.6. EBI on littering and its constituent variables.

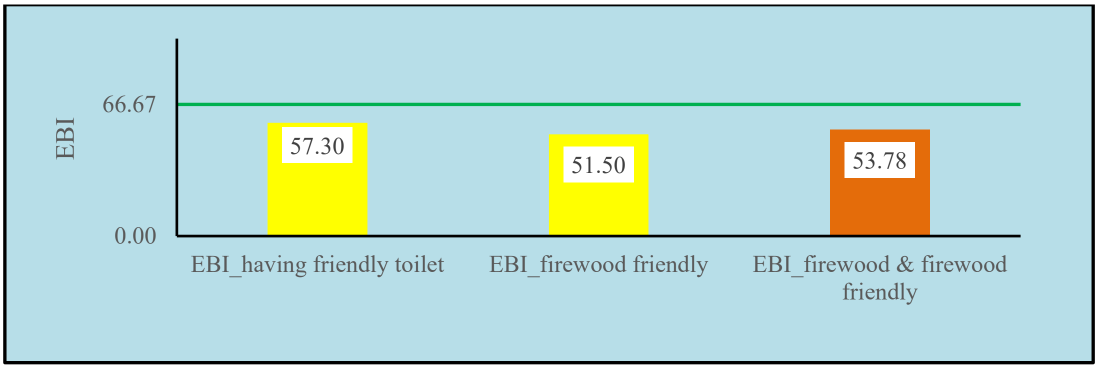


Source: Drawn by the author based on household survey from Fieldwork (2016).

6.2.2.5 *The hybrid dimension: Use of firewood and having a toilet in the house*

This is the dimension comprising a variable from the dimension on energy use and a variable from the dimension on housing. As mentioned earlier, this dimension is formed by combining two of the 15 variables (energy use and having a toilet with septic-tank in the house) that together did not fit neatly into any of the other dimensions considered in this study. This hybrid dimension has an EBI value of 53.78, putting it in the environmentally not-friendly category. The EBI of the two variables of this dimension are 53.70 and 51.50, putting both in the environmentally not-friendly category (Figure 6.7).

Figure 6.7. EBI of the firewood and toilet factor and its variables.

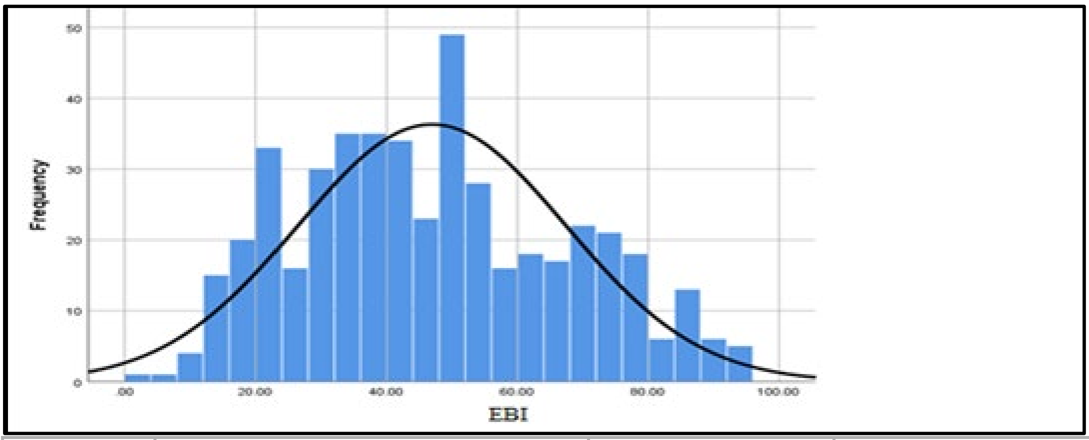


Source: Drawn by the author based on household survey from Fieldwork (2016).

6.2.3 **The macro level results**

The EBI at the macro level (i.e., at the provincial level) is measured by the average of the micro level EBI. Both the micro and macro level EBIs measure the environmental behaviour of the people of South Sumatra taking together all the dimensions considered in this study. This is different from the meso level EBIs, which measure people's environmental behaviour in each dimension and their constituent variables.

Figure 6.8. The distribution of EBI at the micro level.



	Minimum	Maximum	Mean
EBI	2.18	94.73	46.92

Source: Drawn by the author based on household survey from Fieldwork (2016).

It has been seen earlier that the micro level EBI ranges from 2.18 to 94.73, thus, the average EBI for South Sumatra is 46.92 (see Figure 6.8), which puts the province in an environmentally not-friendly category. The province needs to improve its EBI by 21.58 points to be an environmentally friendly province. This poor showing of the people of South Sumatra in terms of their environmental behaviour is due to the fact that they have displayed environmentally unfriendly behaviour (at the meso level) in four of the five dimensions considered in this analysis. Thus, another way of stating what improvement the people of South Sumatra need to make in order to make their province environmentally friendly is to say that they should display environmentally friendly behaviour in at least three of the five dimensions considered here. But even then they would be environmentally friendly in three of the five dimensions, not two two-thirds, still falling short of becoming environmentally friendly as defined in this study.

6.3 How many are environmentally friendly, how many are not?

A useful way of portraying people's environmentally friendly behaviour is to estimate the prevalence of environmental friendliness, or the proportion of the population, which is environmentally friendly, as defined in this study. This is done by using the friendliness line (see Figure 5.10 in Chapter 5) as the cut-off point. As defined earlier in Chapter 5, the cut-off is set at two-thirds of the way from the minimum to the maximum value of EBI. When the EBI ranges from 0 to 100, as it does in this thesis, the cut-off is set at an EBI value of 66.67 (two-thirds of 100). An EBI value of 66.67 or more is considered as environmentally friendly, conversely, an EBI value less than 66.67 is considered environmentally not-friendly.

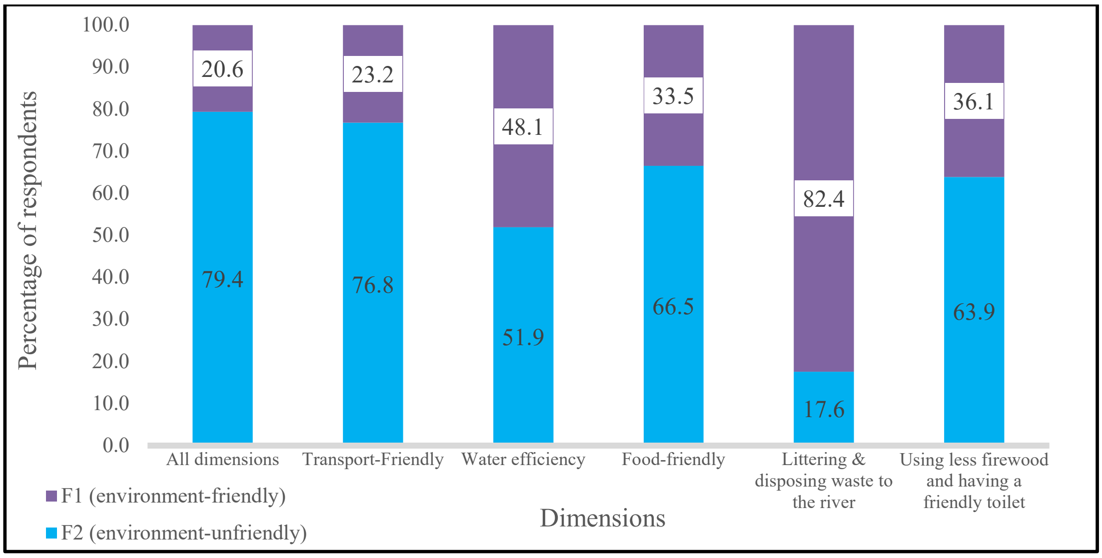
The prevalence of environmental unfriendliness is measured by the headcount ratio, which is an adaptation of a definition from poverty analysis. The headcount ratio, denoted by F_2, refers to the proportion of environmentally unfriendly people in the sample. This amount is equal to the proportion of EBI located in the area bound by the friendliness line and the minimum of EBI. The complement of the headcount ratio gives the prevalence of environmental friendliness, which is represented by the area bounded by the area between the friendliness line and the maximum value of EBI.

In this study, the headcount ratio of environmental unfriendliness in South Sumatra or F_2 is 79.40%. Conversely, only 20.60% of the people of South Sumatra is environmentally friendly (F_1 — headcount ratio of environmental friendliness).

However, while measuring the prevalence of environmental unfriendliness (F_2), this research reveals that the state of F_2 has not been uniform across different dimensions.

Figure 6.9 shows a disaggregation of the number of environmentally unfriendly people according to the dimensions/variables contributing to the EBI. In general, data by dimension show that the highest proportion of environmentally unfriendly people are located in the dimension on transport. It shows that more than three-quarters of the respondents failed to behave in an environmentally friendly manner in this factor, which implies that less than one-quarter of the total sample succeeded in adopting transport-friendly behaviour in their daily life.

Figure 6.9. Percentage of environmentally friendly and environmentally unfriendly people for each dimension.



Source: Drawn by the author based on household survey from Fieldwork (2016).

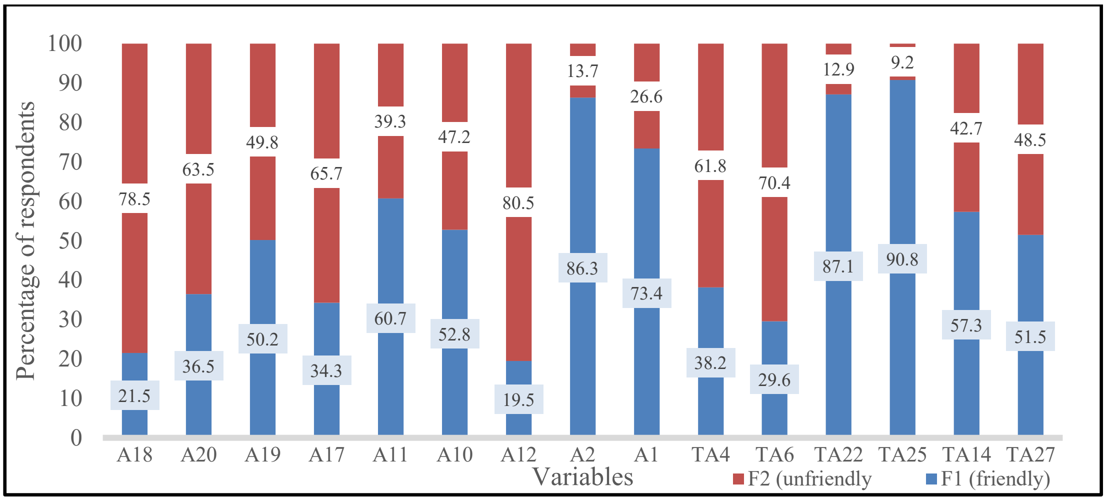
Furthermore, Figure 6.10 reveals that the prevalence of unfriendliness was more dominant at six variables. These variables include A12, A18, TA6, A17, A20, and TA4. More than half of the respondents were performing an unfriendly behaviour at these variables. Contrarily, in the other nine variables, more people were behaving friendly. This condition shows a great difference in the performance of at the dimension level.

Figure 6.10 also shows that the highest prevalence of unfriendliness is at variable A12 (re-using grey water), followed by A18 (using Pertamax/Pertalite) and TA6 (consuming fish or seafood). The proportion of people who were not performing friendly behaviour by re-using grey water in their lives equalled 80.5% of the total respondents meaning less than one-fifth of the respondents were already adopting this activity in their daily lives. Similarly, the proportion of respondents who were less than often using Pertamax/Pertalite for their fuel transportation was also very dominant. Figure 6.10 shows that the proportion of these people accounted for more than three-quarters of the total respondents. Meanwhile the proportion of people who were behaving unfriendly while ‘consuming fish or seafood’ accounted for about 70.4%.

Figure 6.10 also shows that although transport-friendly dimension (transport-friendly) has the highest proportion of unfriendly people among all other dimensions, however, the proportions of unfriendly people were not dominant in all variables within this factor (see variables A17, A18, A19 and A20 at Figure 6.10). As an example, variable A19 has the proportion of ‘friendly’ people in this variable as the majority.

Figure 6.10 further unveils large varieties within variables forming the EBI of the food-friendly dimension. It shows that the proportion of friendly people were dominant at two variables i.e., A1 (consuming local food) and A2 (consuming fruit or vegetables). Conversely, the proportion of ‘unfriendly’ respondents was also dominant at the other two variables within this dimension, i.e., TA4 (consuming chicken) and TA6 (consuming fish or seafood).

Figure 6.10. Percentage of environmentally friendly and environmentally unfriendly people for each variable.



Source: Drawn by the author based on household survey from Fieldwork (2016).

6.4 The environmental unfriendliness gap and the severity of environmental unfriendliness

6.4.1 The environmental unfriendliness gap

There are degrees of unfriendliness among the environmentally unfriendly people. For example, according to the cut-off adopted in this study, anyone with an EBI less than 66.67 is considered unfriendly to the environment. However, the unfriendliness of people with an EBI of 60.00 would be less compared to the unfriendliness of people with an EBI of 50.00. But the headcount ratio of environmentally unfriendly people would not make any distinction between these two groups of people. Therefore, it would be pertinent to measure the extent, or intensity of unfriendliness among the environmentally unfriendly people of South Sumatra. Adopting the concept of poverty gap ratio from poverty analysis (World Bank Institute, 2005) it is attempted to measure an environmentally unfriendliness gap ratio (F_3) in the present study. F_3 measures the extent to which individuals fall below the friendliness line (the environmental unfriendliness gaps) as a proportion of the friendliness line. The sum of these unfriendliness gaps gives the minimum change required in environmental behaviour to eliminate environmental unfriendliness, if the changes were perfectly targeted. The measure does not reflect changes in inequality among the environmentally unfriendly people. This gap is measured by the ratio of the sum of the differences between the EBI score of the environmentally unfriendly people and the friendliness line. It is usually expressed as a percentage of the friendliness line.

In symbolic terms, the unfriendliness gap index = $1/N \{ \Sigma^{k}_{1} (F_0 - y_j)/F_0\}$

Where,

N = Total population (the size of the sample in this case,

k = Total number people with environmentally unfriendly behaviour

y_j = EBI value of the j^{th} environmentally unfriendly individual

F_0 = Friendliness line

The unfriendliness gap reflects the EBI required by all environmentally unfriendly individuals to reach the friendliness line. In other words, if this gap is multiplied by the friendliness line, it gives the increase in the mean score of unfriendly households required to eliminate their unfriendliness completely. This should, of course, be interpreted as the minimum score required, as the elimination of unfriendliness with this ‘minimum score’ would also require it to be ‘optimally’ allocated within the right variable.

The unfriendliness gap index is an improvement over the headcount ratio which simply counts all the people below a friendliness line, in a given population, and considers them equally unfriendly. The unfriendliness gap index estimates the depth of unfriendliness by considering how far, on average, the unfriendly people are from the friendliness line.

Furthermore, the unfriendliness gap index provides a clearer perspective on the depth of the unfriendliness. Not only does it enable comparisons, it also helps to provide an assessment of a region's progress in environmentally unfriendly behaviour alleviation and the evaluation of specific public policies or private initiatives. Hence, this measure is a useful indicator to enrich our understanding about the state of friendliness or unfriendliness within the EBI in the case of study.

This gap is expressed as a percentage or a fraction, but in this study it is expressed as a fraction, so that the value of the unfriendliness gap ranges between 0 (zero) and 1 (one). A theoretical value of zero implies that no one in the population is below the friendliness line*,* while a value of 1 (one) implies that everyone in the population is unfriendly towards the environment.

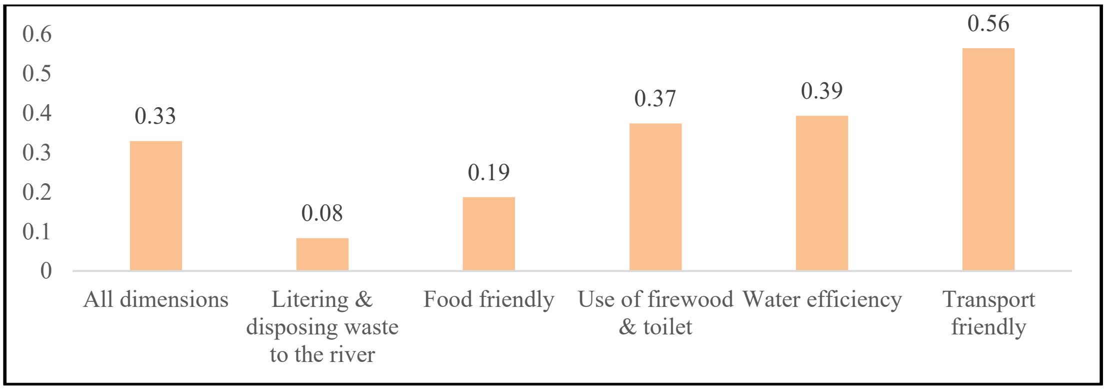
In the present study, the unfriendliness gap is found to be 0.33 (See Figure 6.11), or 33% of the friendliness line. This means the average gap between the environmentally unfriendly people’s EBI and the friendliness line is almost equal to one-third of the friendliness line itself.

Moreover, Figure 6.11 shows that the highest gap of unfriendliness occurs at the transport dimension while the lowest gap was at the littering dimension. This indicates that the depth of unfriendliness in transport was the highest among all the dimensions/factors whereas the depth of unfriendliness in littering is the lowest.

Furthermore, this research reveals that the unfriendliness gap in the dimension on transport-friendly is 0.56 (see Figure 6.11). It implies that generally the gap between the transport-unfriendly people's EBI and the friendliness line was more than half of the friendliness line itself.

Meanwhile, the unfriendliness gap for the littering dimension reached 0.08% (see Figure 6.11). This implies that the average gap between the litter-unfriendly people's EBI and the friendliness line accounted for 8% of the friendliness line.

Figure 6.11. The unfriendliness gap among dimensions.



Source: Drawn by the author based on household survey from Fieldwork (2016).

6.4.2 **How severe is the unfriendliness of the environmentally unfriendly people?**

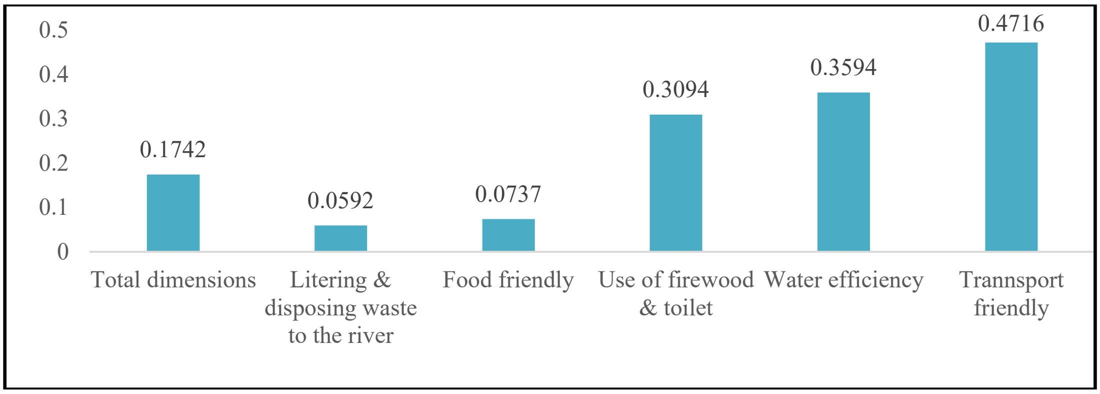
Finally, to enrich the description of the macro level EBI, this study also presents the 'severity index (S)', which attaches weights to households according to how far they are below the friendliness line. S is the mean squared proportionate unfriendliness gap. This measure reflects the degree of inequality among the environmentally unfriendly group. Although, it is not as easy to interpret this index compared to F_1, F_2 and F_3, however it has the advantage of reflecting the degree of inequality among the environmentally unfriendly people, in the sense that the greater the inequality of distribution among these people the higher is the severity of unfriendliness (S).

The severity index is basically also a friendliness gap. It measures the gap between the friendliness line and the average EBI of the unfriendly people. The higher the gap the deeper in unfriendliness they are. The severity index in the present study is estimated to be 0.17 (See Figure 6.12) which implies that the gap between the friendliness line and the average EBI of the unfriendly people was about 17%.

Furthermore, by measuring the severity index of the EBI, this study also reveals in which factor the level of unfriendliness experiences the most severe. Severity Index by factors ranges from 0.06 to 0.47, while in total the severity index is 0.17 (see Figure 6.12). The last number implies that the gap between 'the friendliness line' and 'the average EBI of the unfriendly people' was about 17.42%. Of all those factors, Figure 6.12 shows that transport-friendly has the highest severity index, while littering and disposing waste to the river dimension has the lowest. Consequently, this implies that the transportation dimension experiences the highest severity among all the factors. Reversely, littering and disposing of waste to the river dimension experiences the least severe.

The severity index of the transportation dimension reached 0.47 (see Figure 6.12), implying that the gap between 'the friendliness line' and 'the average EBI of the transport-unfriendly people' was about 47.16%. Meanwhile, the severity gap of the water-friendly dimension reached 0.36, and the severity index of the use of firewood and toilet dimension reached 0.31 (see Figure 6.12).

Figure 6.12. The severity index between dimensions.



Source: Drawn by the author based on household survey from Fieldwork (2016).

Data by variables shows that the severity index in the case of study ranges from 0.09–0.81 (see Figure 6.13). Variables A12 had the highest severity, followed by variable A18 and TA6. Meanwhile, the lowest severity belongs to variable TA25 which implies that the unfriendliness index in variable A12 is the most severe among all the variables. On the contrary, the unfriendliness index of variables TA25 is the least severe.

Figure 6.13. The severity between variables

Source: Drawn by the author based on household survey from Fieldwork (2016).

The severity index of variable A12 reached 0.81 (see Figure 6.13) indicating that the gap between the friendliness line and the average EBI of greywater-unfriendly people was about 81%. Meanwhile, the severity index of variable A18 reached 0.79 (see Figure 6.13) meaning the gap between the friendliness line and the Pertamax/Pertalite-unfriendly people's EBI was 79%. Next, the severity index of variable TA6 reached 0.70 (see Figure 6.13) with a gap between the friendliness line and the fish-unfriendly people's EBI was about 70%.

6.5 Conclusion and limitations of this analysis

6.5.1 Conclusion

This study reveals that, the environmental behaviour of the people of South Sumatra is very poor. This is reflected in people's unfriendly behaviour at the micro, meso and macro levels. At the macro level, people's environmental behaviour index (EBI) is 46.92 on a scale of 0 to 100, which is well below the friendliness line of an EBI 66.67. There are many challenges, which contribute to this low level of EBI at the macro level, however, it might help understand the problem better by examining the EBI at the micro and the meso levels.

First, at the micro level, although the findings reveal the availability of respondents performing environmentally friendly in the case study, however, their proportion was relatively small compared to the proportion of the people performing unfriendly behaviour. Figure 6.1 shows that the bulk of the respondents are located below the friendliness line. As mentioned before, 79.40% of the respondents are located below the friendliness line. This means that 370 out of 466 respondents are unfriendly towards the environment: conversely, only 96 of the 466 respondents are friendly towards the environment.

Secondly, at the meso level, it was found that out of five dimensions on which environmental behaviour is measured, the respondents displayed environmentally friendly behaviour in only one dimension, namely littering-related activities. Conversely, the respondents' behaviour was not-friendly to the environment in the other four dimensions, as indicated by their EBI scores below the friendliness line. A finding in previous chapter (Chapter 5) has shown that the contribution of these four dimensions to the total EBI score is very high (see Figure 5.9 in Chapter 5), which explains the very low EBI at the macro level.

Elaborating on the information contained in Figure 5.9 in Chapter 5, it can be seen that the contribution of the one and only dimension possessing 'friendly' EBI i.e. the activities related to littering is about 0.07%. This is tiny compared to the total contribution of the other four factors holding 'unfriendly' EBIs. The two highest contributing dimensions to the total EBI, namely the dimension on transport-friendly and the dimension on water efficiency have the lowest EBIs among all dimensions, with values of 35.02 and 49.85 respectively (see Figure 6.2). The low EBI of the dimension on transport-friendly is caused mostly by the poor performance of all three variables constituting this dimension (see Figure 6.2). Moreover, the respondents displayed the worst environmental behaviour with respect to the variables that contribute the most to this dimension, namely consuming a lower carbon fuel (Pertamax/Pertalite), which explains its large negative contribution to the low EBI for the dimension on transport at the macro level.

To conclude, this research measured the EBI at three levels, i.e. the micro, the meso and the macro level. The finding of this study indicates that respondents in the case of study tend to behave unfriendly towards the environment at all levels of the environmental behaviour; the micro, the meso and the macro level. At micro level, this study found out the existence of bulk of respondents holding EBI below the friendliness line. At micro level, this research reveals that the EBI ranges from 2.18 to 94.73. Further investigation at the meso level, shows that respondents performed friendly only one out of five dimensions. This indicates that people were performing unfriendly at the majority of the dimensions. Moreover, the finding also shows that the people achieved the lowest level of EBI at the most dominant dimension. This condition contributes the most to the achievement of the low level of the EBI at the macro level that is equal to 46.92, which is still far behind the friendliness line.

In addition, identifying and actively targeting people with low EBI performance can be seen as a potentially successful alternative to conserve the environment. However, although it may sound simple, it is currently very difficult for policy makers to know which people pose the low EBI. Thus, research is needed to inform policy makers who these low EBI holders actually are. Once this is established, policies to help foster the environmental behaviour will be more feasible. The next chapter will provide descriptions about the profile of the environmentally friendly people versus the environmentally unfriendly people in the case study concerning their demographics and socioeconomic characteristics.

6.5.2 **Limitations**

Monitoring people's environmental behaviour is an activity for behavioural monitoring and generally this may be done by direct observation or self-reporting by the respondents. However, as behaviour is such a latent construct, it is difficult to be observed directly. Furthermore, observing behaviour directly takes time, especially if the respondents and the list of environmental behaviours being studied are numerous. Therefore, considering the time limit, the cost, numbers of environmental behaviour and respondents being researched, as well as the location of the respondents, this research is based on self-reported responses to the questions canvassed by the interviewer. In addition, previous studies have also supported the use of self-reported measure for environmental behaviour (see Kormos & Gifford, 2014; Steg & Vlek, 2009; Tarrant & Cordell, 1997).

The findings of this study are limited only to the respondents in South Sumatra Province. However, the methods of data collection and analysis can be adopted for further research, not only in other areas of Indonesia, but in other countries as well, albeit with appropriate modifications in the choice of domains and the variables within each domain. Furthermore, as the study was mostly focused on collecting information from the household perspective, with household head or the spouse as the major respondents, the perceptions and experiences portrayed here may not necessarily represent those of people of all marital status.

CHAPTER: 7 WHAT DISTINGUISHES THE ENVIRONMENTALLY FRIENDLY PEOPLE OF SOUTH SUMATRA? A STUDY OF THEIR DEMOGRAPHIC AND LIFESTYLE CHARACTERISTICS

7.1 Introduction

Previous chapters have described the demographic and lifestyle characteristics of all the respondents of the study in Chapter 5 and introduced Environmental Behaviour Index — EBI as an indicator to measure the level of environmental behaviour at micro, meso and macro level in Chapter 6. This chapter discusses the demographic and lifestyle characteristics separately for the environmentally friendly and environmentally unfriendly people. This will answer the second and the third research questions, i.e. “What distinguishes the environmentally friendly people of South Sumatra?” and “Do people’s socioeconomic characteristics have a role in these differences?”

To address these research questions, this chapter is divided into two major sections. The first part explores the profile of the environmentally friendly people (EFP) and environmentally not-friendly people (EnFP) according to their socioeconomic characteristics. The second major section outlines the proportion of the EFP and EnFP in each category. As discussed in Chapters 5 and 6, the socioeconomic characteristics refer to demographic and lifestyle factors.

7.2 Environmental Behaviour: Who are the Environmentally Friendly People (EFP) and who are not?

This section is devoted to examining the demographic and lifestyle factors associated with the environmental behaviour of the respondents. This involves, examining first, at the micro level (Table 7.1), the average EBI scores of the respondents with respect to each characteristic in each category and identifying which EBI score in each characteristic is above, or closest to the friendliness line (i.e., EBI score of 66.67; see Figure 5.10 in Chapter 5). Second, this chapter examines, at the meso level (i.e., at the level of dimensions, Table 7.2), the average EBI scores of the respondents with respect to each characteristic in each dimension and compares the same with the friendliness line and identifies which characteristic shows an EBI equal to or above the friendliness line, and therefore environmentally friendly people (EFP) and which characteristic shows an EBI below the friendliness line, and therefore environmentally not-friendly people (EnFP).

7.2.1 **The demographic characteristics**

This subsection investigates which people perform in the most environmentally friendly manner with respect to each of the seven demographic characteristics, namely gender, location, education level, household size, age, migration status and employment. A detailed description about the demographic characteristics of respondents was presented in Chapter 5.

7.2.1.1 ***Sex***

The female respondents display better environmental behaviour than their male counterparts, as indicated by the higher EBI scores of females. This is true at both the micro and meso levels for each of the five dimensions considered in this study (Tables 7.1 and 7.2). However, except for the dimension on waste or littering, neither the females nor the males can be considered environmentally friendly as their EBI scores are below the friendliness line (EBI of 66.67 or more). In the waste or littering dimension, both the female and male respondents show strong environmentally friendly behaviour (Table 7.2), but their environmentally unfriendly score (EBI less than 66.67) in the other dimensions has resulted in their overall environmentally unfriendly behaviour at the macro level.

Furthermore, the EBI scores for each of the 15 variables considered in this research reveal that both the female and male respondents show environmentally friendly behaviour in four variables, i.e. dropping waste into the river/waterways (TA25), consuming fruits/vegetables (A2), littering (TA22) and consuming local food (A1) (see Figure 7.1) as indicated by their EBI scores above the friendliness line. Nevertheless, both the female and male respondents are environmentally unfriendly in the other 11 variables.

A further contrast between the sexes reveals that males exhibit better environmental behaviour in only three variables — having shorter showers (A10), having a toilet in the house with a septic-tank (TA27) and consuming fruits/vegetables (A2); in the other

12 variables the female respondents exhibit better environmental behaviour (Figure 7.1).

Table 7.1. Environmental behaviour index (EBI) according to the demographic characteristics of the respondents at the macro level.

Demographic Characteristics		Variables	EBI
1.	Sex	Male Female	45.23 48.62
2.	Location a. Urban/Rural b. Regency	 Urban Rural OKI Lahat Muba OKUS Palembang	 48.70 46.11 42.34 50.48 46.11 46.00 49.75
3.	Education	Max Primary School Junior School and Above	47.81 45.36
4.	Household Size	≤4 >4	47.89 44.56
5.	Age	Younger (18–39 years) Middle (40–50 years) Older (51 years and older)	44.47 45.08 50.86
6.	Employment	Agricultural Non-agricultural	46.52 46.55
7.	Migration	Non-migrant Migrant	47.39 45.82

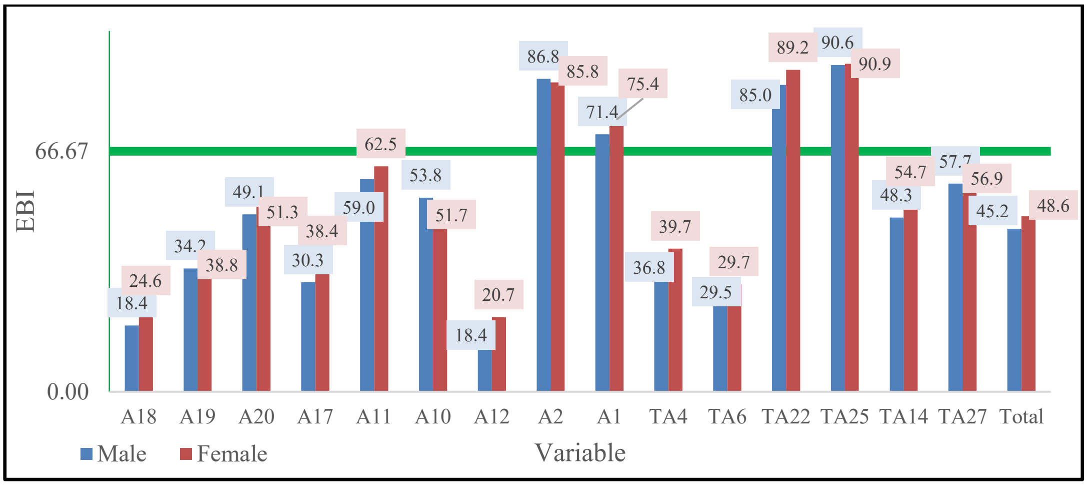
Source: Prepared by the author based on household survey from Fieldwork (2016).

Table 7.2. Average environmental behaviour index (EBI) according demographic characteristics of the respondents at the meso level.

Demographic characteristics		Variables	Transport-friendly	Water-friendly	Littering	Food-friendly	Toilet friendly
1.	Sex	Male Female	32.51 37.55	49.19 50.51	87.24 89.91	58.85 60.24	51.99 55.59
2.	Urban/Rural	Urban Rural	33.94 35.50	57.61 46.34	92.95 86.59	55.40 61.42	83.66 40.29
3.	Regency	OKI Lahat Muba OKUS Palembang	30.54 44.65 26.95 42.07 32.87	39.33 47.81 64.04 30.93 63.98	86.41 73.98 96.83 91.23 93.69	60.92 65.32 56.61 59.15 56.26	49.63 30.68 58.44 37.65 84.51
4.	Education	Max Primary School Junior School and Above	38.19 29.49	47.40 54.12	86.94 91.41	60.61 57.68	46.69 66.13
5.	Household Size	≤4 >4	36.68 30.98	50.11 49.21	88.83 87.93	60.20 57.96	52.16 57.73
6.	Age	Younger (18–39 years) Middle (40–50 years) Older (51 years and older)	29.19 32.88 42.30	51.36 48.04 50.17	90.86 86.65 88.29	60.13 58.56 59.93	51.39 51.99 57.63
7.	Employment	Agricultural Non-agricultural	38.14 31.87	42.88 53.65	84.71 91.23	61.51 56.48	38.52 74.87
8.	Migration	Non-migrant Migrant	36.75 31.82	47.92 51.79	87.17 91.86	59.81 60.14	55.44 47.47

Source: Prepared by the author based on household survey from Fieldwork (2016).

Figure 7.1. Average EBI for each variable by sex.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

7.2.1.2 ***Residential location***

There are two types of residential location of the respondents considered in this research — (i) urban/rural and (ii) regencies/city. The definition of urban and rural used by the Indonesian Board of Statistics (BPS, 2010c) is used in the present research. In deciding whether a specific area is urban or rural, BPS (2010c) utilises several criteria, such as: the population density, the percentage of agricultural households and the number of urban facilities. A respondent's area of residence was thus identified as rural or urban under the above definition. Information about the regencies/city of residence of the respondent was obtained from responses to a question in the household survey which asked about the regency/city where the respondent resided.

At the macro level the respondents living in urban areas display better environmental behaviour than those living in rural areas (Table 7.1), and this is reflected also at the meso (dimension) level, except for the dimensions on transport and food, where the rural respondents showed better environmental behaviour. The rural respondents' better environmental behaviour in transport and food can be expected as they would use less environmentally damaging transport and consume more of food-friendly products. On the other hand, the urban respondents' better environmental behaviour in water, littering and toilets is also to be expected because of available facilities for using water in a controlled manner, for appropriate waste disposal and proper toilets. Both the urban and rural respondents have shown environmentally friendly behaviour (EBI more than 66.67) in the dimension on waste/littering and only the urban respondents are environmentally friendly in the dimension on toilets (Table 7.2).

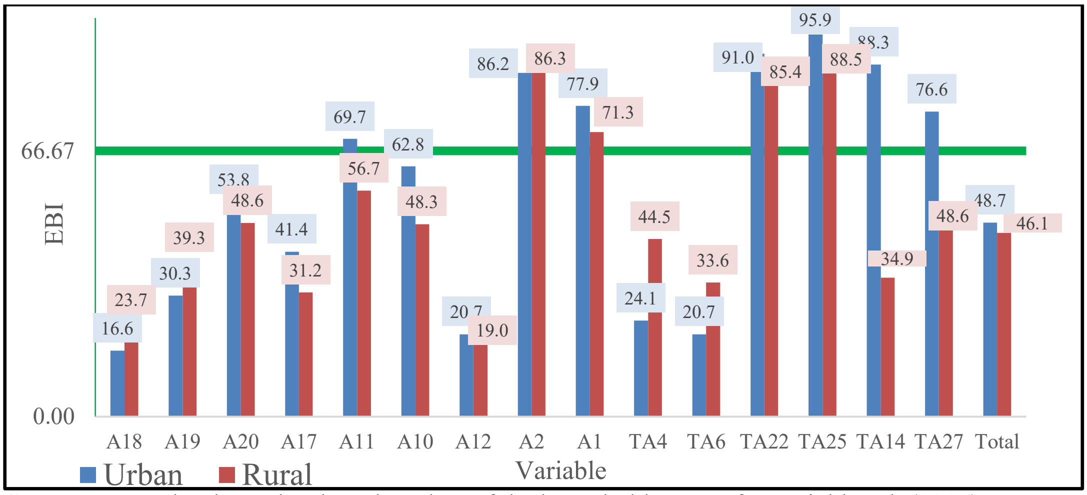
In terms of regency/city, at the macro level the respondents from Lahat display better environmental behaviour than the respondents from the other four regencies/city and the respondents from OKUS show the worst environmental behaviour (Table 7.1). But the picture is mixed at the meso level, where the respondents from Lahat show better environmental behaviour than those from the other regencies/city only in the dimensions on transport and food. The worst displays of environmental behaviour in these two dimensions come from the residents of Muba and Palembang respectively (Table 7.2) although MUBA has the best environmental behaviour in the water and littering dimensions, while Palembang has the best environmental behaviour in the toilet dimension. The worst environmental behaviour in these three dimensions are displayed respectively by OKUS and Lahat. It is noteworthy in Table 7.2 that all the five regencies/city are environmentally friendly (EBI more than 66.67) in the littering dimension and only Palembang is environmentally friendly (EBI more than 66.67) in the toilet dimension. There are no environmentally friendly regencies/city (EBI less than 66.67) in the other dimensions.

In terms of the constituent variables, Figure 7.2 shows that on average, the best environmental behaviour by both the urban and rural respondents are observed for the variable dropping waste into the river/waterways (TA25) (EBI more than 90), whereas the urban respondents display the worst environmental behaviour in the variable using low carbon fuel (A18) (EBI = 16.6), and the rural respondents show the worst environmental behaviour for the variable re-using grey water (A12) (EBI = 19).

A comparison of all the 15 variables contributing to the EBI shows that the urban respondents displayed better environmental behaviour for only six variables, and the rural respondents performed better for nine variables.

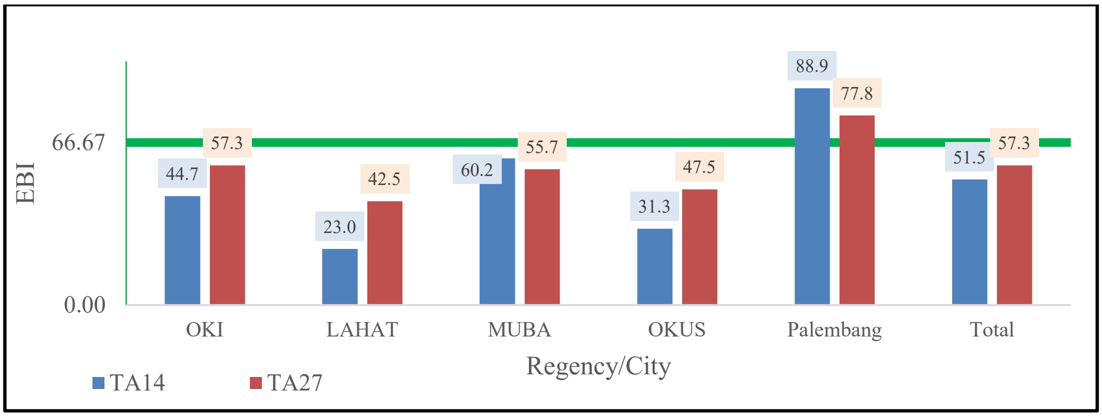
Figure 7.2 also shows very large differences in the EBI scores between urban and rural respondents for the variables using firewood for cooking (TA14) and having a toilet in the house with a septic-tank (TA27).

Figure 7.2. The average EBI per variable by urban/rural.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

Figure 7.3. EBI for variables TA14 and TA27 according to regency/city.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

Furthermore, since the two variables — using firewood for cooking (TA14) and having a toilet in the house with a septic-tank (TA27) — show the largest urban/rural differential in environmental behaviour, it would be worth investigating how the regencies/city performed with respect to these two variables. The large differentials are probably explained by the fact that the respondents from Palembang (the city), the most urbanised administrative unit in South Sumatra, display highly friendly environmental behaviour for these two variables (EBI much greater than 66.67), while the other administrative units (regencies), which are much less urbanised display environmentally unfriendly behaviour (EBI less than 66.67), as shown in Figure 7.3.

7.2.1.3 *Education*

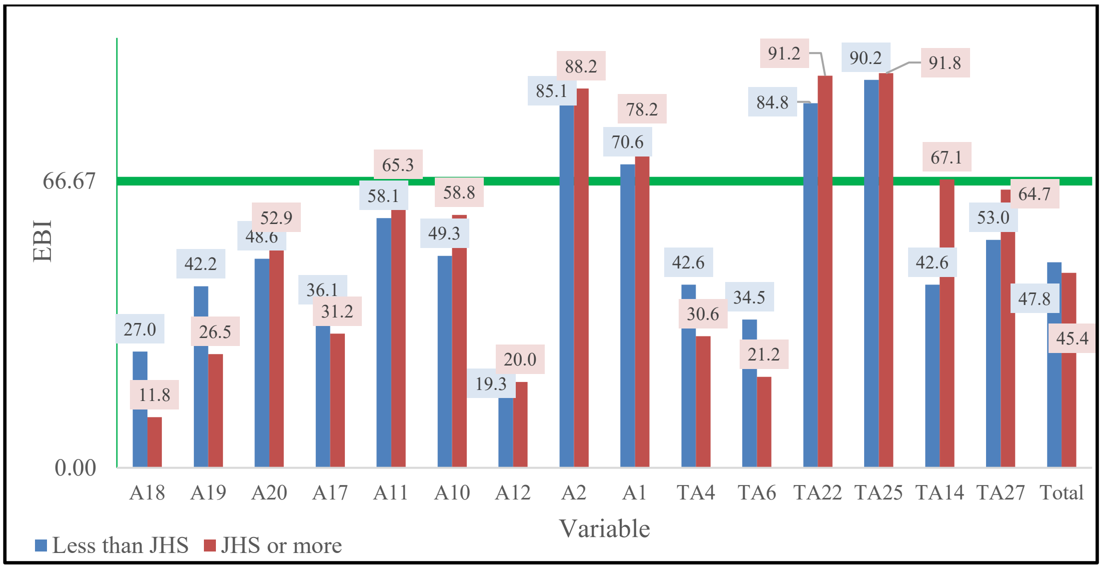
In the household survey, the respondents were asked about their highest educational level attained. The distribution of the respondents by education reveals that more than one-half of them have Primary School as their highest completed level of education (see Table 5.1 in Chapter 5). As such, for the purpose of this analysis, the seven education categories listed on the household questionnaire have been grouped into two categories: (i) lower educational level — less than Junior High School (JHS), and (ii) higher educational level — completed JHS or more. With this categorisation, a lower level of education is found to be unexpectedly associated with slightly better environmental behaviour at the macro level, although the difference in EBI scores of the two education categories is very small (Table 7.1). However, the same is not true at the level of dimensions (Table 7.2), where higher education is associated with better environmental behaviour in three of the five dimensions, namely water, littering and toilets, while a lower level of education is associated with better environmental behaviour in the dimensions of transport and food (Table 7.2).

After disaggregating the average EBI by educational level, it is seen that the more highly educated respondents perform better in 10 of the 15 variables. These variables include one variable in the transport dimension, i.e. conducting routine machine check (A20); all three variables in the water-friendly dimensions, i.e. saving water while cooking (A11), having shorter showers (A10), re-using grey water (A12); half of variables in the food-friendly dimensions, i.e. consuming fruits/vegetables (A2), consuming local/traditional food (A1); all variables in the littering dimension and firewood & toilet friendly dimension, i.e. TA22 (littering (TA22), dropping waste into the river/waterways (TA25), using firewood for cooking (TA14), and TA27 (having a toilet with septic-tank (TA27) .

In contrast the lower educated respondents perform better in five variables, i.e. three variables in the transport-friendly dimensions, i.e. using low carbon fuel (A18), reducing the use of private transport (A19) and using public transport (A17); and half of variables in the food-friendly dimensions — consuming chicken (TA4) and consuming fish/seafood (TA6).

Surprisingly, the overall EBI appears to show better environmental behaviour by the lower educated respondents (see Figure 7.4). Although lower educated people perform at a fewer number of variables, these variables have high contribution to the creation of EBI (see Figure 5.8 Chapter 5). Furthermore, the gaps between the EBIs of the two education groups in variables where the higher educated people perform better, are smaller than the gaps in variables where the lower educated people perform better. For example, in variable A18 where lower educated people perform better, the EBI gap was 15.26 (from 27.0 minus 11.8). In another case, in variable A20 where higher educated people perform better, the EBI gap was only 4.2 (from 52.9 minus 48.7).

Figure 7.4. EBI for each variable according to educational level.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

Furthermore, respondents from both education categories display environmentally friendly behaviour (EFB) with EBI scores of more than 66.67 for the variables — consuming local/traditional food (A1), consuming fruits/vegetables (A2), littering (TA22) and dropping waste into the river/waterways (TA25), with the higher educated respondents also showing EFB for the variable — using firewood for cooking (TA14).

7.2.1.4 ***Household size***

Household size is derived from the list of household members collected in the household questionnaire during the household data collection. For the purposes of the present analysis, household size is categorised into two groups: four or less and more than four. Four is selected as the threshold household size, because it is the median of the distribution of respondents according to household size (see Table 5.1 in Chapter 5). Furthermore, a household size of four also coincides with the two-child family norm introduced by the New Order[80] government in the mid-1960s, leading to a household size of four[81] comprising a father, a mother and two children, which has

[80] The New Order is the term used in Indonesia for when the country was under Suharto's Presidency from 1966 to 1998 (Hidayat, 2008; Hull, 2005).

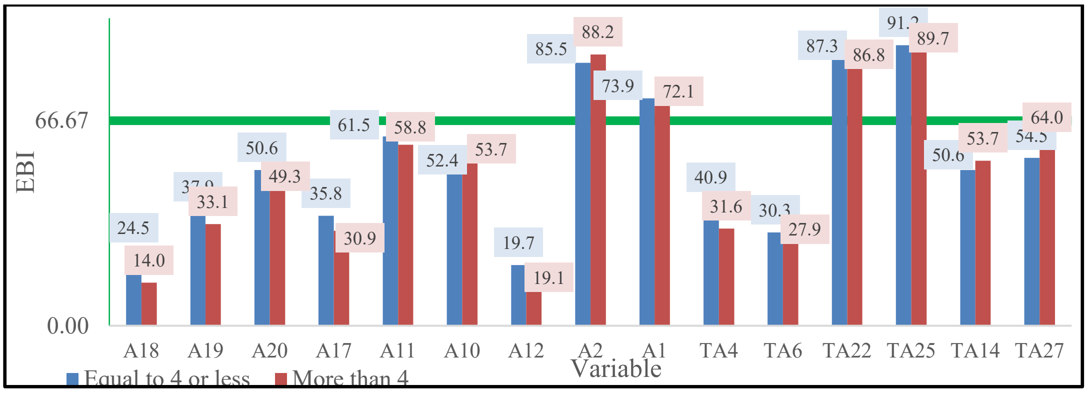
[81] This program was administered by the national Family Planning Coordination Board (BKKBN) of Indonesia in 1970s (Hull, 2005) to promote "small, happy, and prosperous family" by reducing fertility through the use of contraceptives.

become the common family size in many areas of Indonesia (Permana & Westoff, 1999).

A smaller household size is associated with better environmental behaviour at the macro level (Table 7.1) and at the dimension levels of transport, water, littering and food (Table 7.2), but a larger household size appears to foster better environmental behaviour in the dimensions of toilet. However, no household size is associated with an environmentally friendly behaviour (EBI greater than 66.67) in any dimension except the dimension on littering where the households, regardless of size, display EFB.

Furthermore, the average EBI by variable (see Figure 7.5) indicates that generally respondents with smaller-sized households display better environmental behaviour in 11 of the 15 variables considered in this analysis. The variables for which larger sized households appear to display better environmental behaviour are — consuming fruits/vegetables (A2), having shorter showers (A10), using firewood for cooking (TA14) and having a toilet with septic-tank (TA27). A comparison with the friendliness line reveals that both household sizes are associated with environmentally friendly behaviour for the variables —consuming local/traditional food (A1), consuming fruits/vegetables (A2), littering (TA22) and disposing of waste in the river/waterways (TA25) (Figure 7.5).

Figure 7.5. EBI by household size for each variable.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

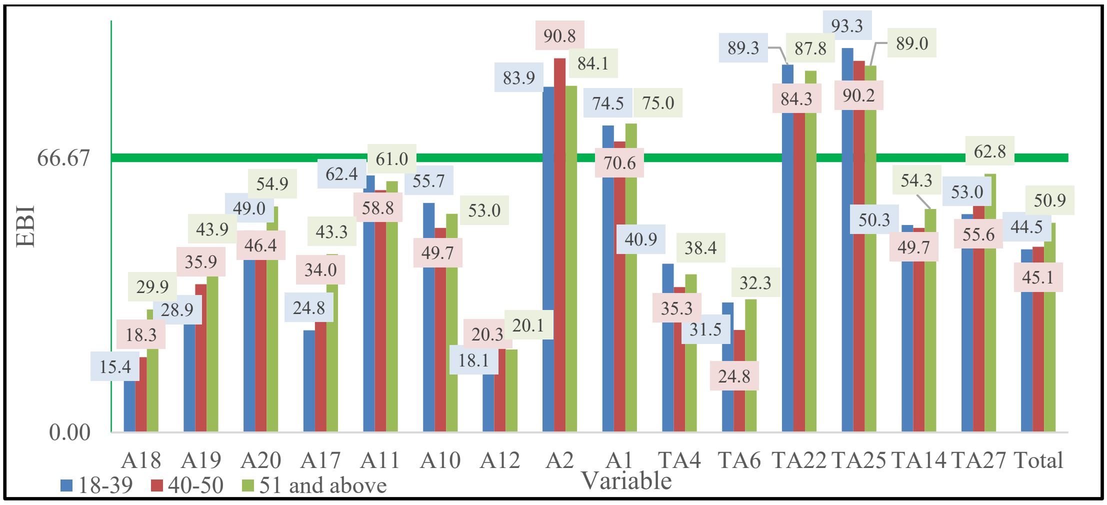
7.2.1.5 *Age*

Information about the age of respondents was obtained from a question to the respondents about their age in completed years. For the purposes of the present analysis, the age has been grouped into three categories: younger (age 18-39 years), middle (age 40-50 years) and older (age 51 years and above). The age-group thresholds were decided based on the 33rd percentile of the age distribution of respondents in the household survey. According to the household survey, the youngest age of the respondents was 18 and oldest was more than 80. The 33 percentile age-group was 40 years old and the 66.67 percentile was 51 year old.

The older respondents show better environmental behaviour at the macro level (Table 7.1) and in the transport and toilet dimensions (Table 7.2), but younger respondents appear to be environmentally better behaved in the water, littering and food dimensions. Respondents of all ages display environmentally friendly behaviour (EFB) in the littering dimension as indicated by their EBI values greater than 66.67.

Table 7.2 shows younger respondents behaving better in three of the five dimensions, and the older respondents behaving better in only two yet the overall environmental behaviour (i.e. at the macro level) is shown by the older respondents (Table 7.1). This apparent anomaly is explained by the fact that one of the dimensions where the older respondents perform better environmental behaviour is in the dimension of transport which has a weight of more than 50% to the overall EBI (see the discussions surrounding Figures 5.8 and 5.9 in Chapter 5).

Figure 7.6. EBI by age of the respondents for each variable.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

The Environmental Behaviour Index (EBI) by age for each variable shows that the respondents of all age-groups display environmentally friendly behaviour (EFB) with EBI scores greater than 66.67 for four variables — disposing of waste in the river/waterways (TA25), related to Littering (TA22), consuming local/traditional food (A1) and consuming fruits/vegetables (A2). Respondents of all three age-groups display the worst environmental behaviour for variable A12, which is the variable concerning use of grey water (see Figure 7.6).

7.2.1.6 ***Employment***

In the household survey, the respondents were asked about their employment, as defined by the Indonesian Board of Statistics or BPS, which is:

> an activity done by a person who worked for pay or assisted others in obtaining pay or profit for the duration at least one hour during the survey week. It includes an unpaid worker who helps an economic activity/ business (BPS, 2018c).

The household survey questionnaire listed twelve types of work for employment, as used in the Susenas of March 2016. However, for the purposes of the present analysis, the type of work is grouped into just two categories: agricultural[82] and non-agricultural, because the majority of the respondents are engaged in agricultural work.

In general, respondents working in both the agricultural and non-agricultural sectors display similar environmental behaviour as indicated by the almost equal EBI scores (Table 7.1) and both fall short of the friendliness line of EBI 66.67.

The EBI scores by employment and dimension indicate that the respondents in the agricultural sector are environmentally better behaved in the transport and food dimensions, while their non-agricultural counterparts display better environmental behaviour in the other three dimensions (Table 7.2).

The average EBI scores for each variable (Figure 7.7) show that the respondents in non-agricultural employment display better environmental behaviour in 11 of the 15 variables, namely — having a toilet with septic-tank (TA27), using firewood for cooking (TA14), disposing of waste in the river/waterways (TA25), littering (TA22), consuming local/traditional food (A1), consuming fruits/vegetables (A2), re-using grey water (A12), having shorter showers (A10), saving water while cooking (A11), using public transport (A17) and conducting routine machine check (A20). Where the

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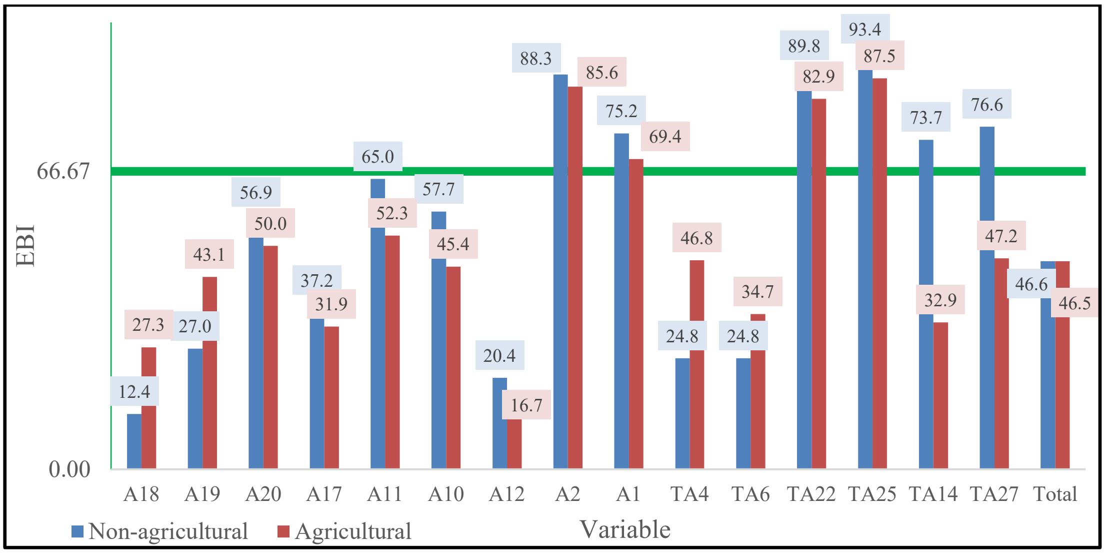
[82] This thesis defines agricultural sector as people working in agriculture/forestry and fisheries/livestock. This refers to main business of (1) and (2) in the household survey questionnaire (see Appendix 2.1).

respondents from agricultural employment behave environmentally better are with respect to the variables — consuming fish/seafood (TA6), consuming chicken (TA4), reducing the use of private transport (A19) and using low carbon fuel (A18). Respondents in both types of employment are environmentally friendly (EBI greater than 66.67) with respect to the variables — TA25, TA22, A1 and A2, while the respondents in non-agricultural employment are environmentally friendly (EBI greater than 66.67) also for the variables — TA27 and TA14 (see Figure 7.7).

Figure 7.7. The average EBI by employment for each variable.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

7.2.1.7 ***Migration status***

The migration status of the respondents is ascertained from information about their (i) place of birth, and (ii) place of current residence [83]. A respondent is categorised as a migrant, if the regency/city of their current residence is different from the regency/city where they were born whereas a non-migrant resides in their birth location.

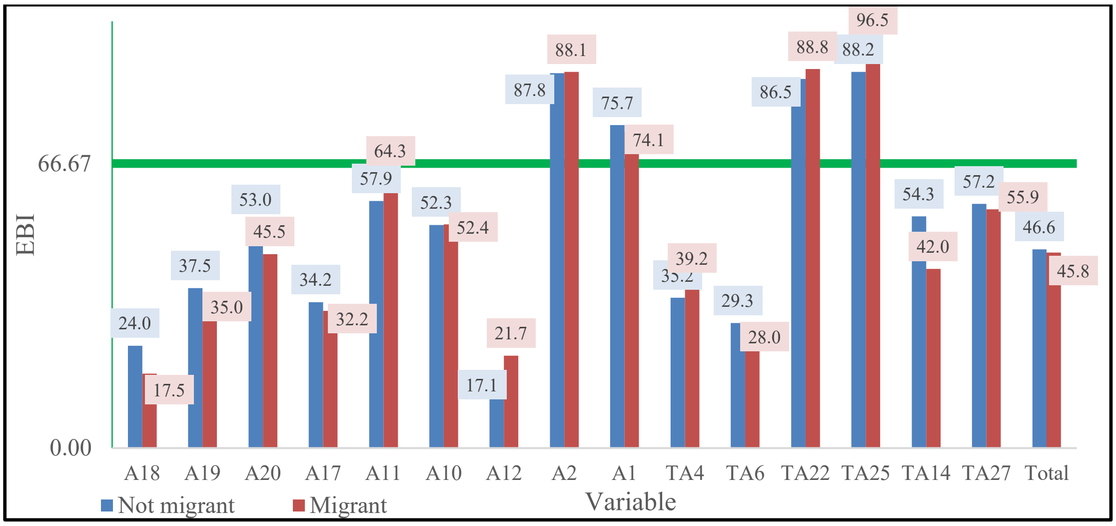
The non-migrants appeared to show slightly better environmental behaviour than the migrants, as the EBI of the non-migrants is greater (Table 7.1), however, neither the migrants nor the non-migrants display environmentally friendly behaviour as their EBIs fall short of the friendliness line of EBI = 66.67.

[83] We gathered data on the place of birth and the current resident of a respondent from Susenas March 2016.

In terms of the dimensions, the non-migrants are slightly better behaved in the transport and the toilet dimensions, while the migrants appear to behave better in the dimensions on water, littering and food. Both the migrants and non-migrants are environmentally friendly in the littering dimension with EBIs greater than 66.67 (Table 7.2).

Furthermore, the average EBI based on variables (Figure 7.8) shows that the non-migrants achieved the lowest EBI for the variable A12 (re-using grey water), while the migrant respondents attained the lowest EBI for the variable A18 (using low carbon fuel). However, both the migrants and the non-migrants scored the highest EBI for the variable — disposing of waste in the river/waterways (TA25). Overall, the non-migrant respondents behaved environmentally better than their migrant counterparts for seven variables, i.e. using low carbon fuel (A18), consuming fish/seafood (TA6), using public transport (A17), reducing the use of private transport (A19), conducting routine machine check (A20), using firewood for cooking (TA14) and having a toilet with a septic-tank (TA27). Both the groups were environmentally friendly for four variables — A1, A2, TA22 and TA25.

Figure 7.8 EBI by migration status for each variable.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

7.2.2 **Environmental behaviour according to lifestyle**

This section examines the environmental behaviour of the respondents according to their lifestyle characteristics. Six lifestyle characteristics were taken from the March 2016 Susenas database. These characteristics are the household expenditure on food items, household expenditure on non-food items and the expenditure per capita; the tourism related activity of the respondents, their smoking habits and access to the internet.

7.2.2.1 *Food, non-food and per capita household expenditure*

For the purposes of this research information about the household food, non-food and per capita expenditure was obtained from the data collected at Susenas. These expenditure data are categorised into three groups, i.e. low (below the 33rd percentile of the total expenditure on the item); middle (between the 33rd and 66th percentiles of the total expenditure on the item); and high (above the 66th percentile of the total expenditure on the item).

Table 7.3. The performance of EBI based on lifestyles characteristics.

Lifestyles Characteristics		Variables	EBI (Mean)
1.	Food Expenditure	low middle high	53.29 43.08 43.86
2.	Non Food Expenditure	low middle high	53.76 44.70 41.78
3	Per Capita Expenditure	low middle high	50.32 43.42 46.49
4.	Tourism Activities	no yes	46.73 47.84
5.	Smoking Habit	no yes	48.09 44.88
6.	Internet Access	no yes	47.39 47.83

Source: Prepared by the author based on household survey from Fieldwork (2016).

At the macro level, the respondents with low expenditure on food items, non-food items and low per capita expenditure display better environmental behaviour compared with respondents with middle and high expenditure as indicated by their higher EBI values (Table 7.3), but no respondent of any expenditure type shows environmentally friendly behaviour because their EBI scores are well below the friendliness line of EBI = 66.67.

The association of low expenditure with better environmental behaviour at the macro level does not hold true at the level of dimensions, where the respondents with low food expenditure are best environmentally behaved at the transport, littering and food dimensions, but those with high food expenditure are the best behaved at the water and toilet dimensions (Table 7.4).

Table 7.4. The average of EBI based on lifestyle characteristics and dimensions of EBI.

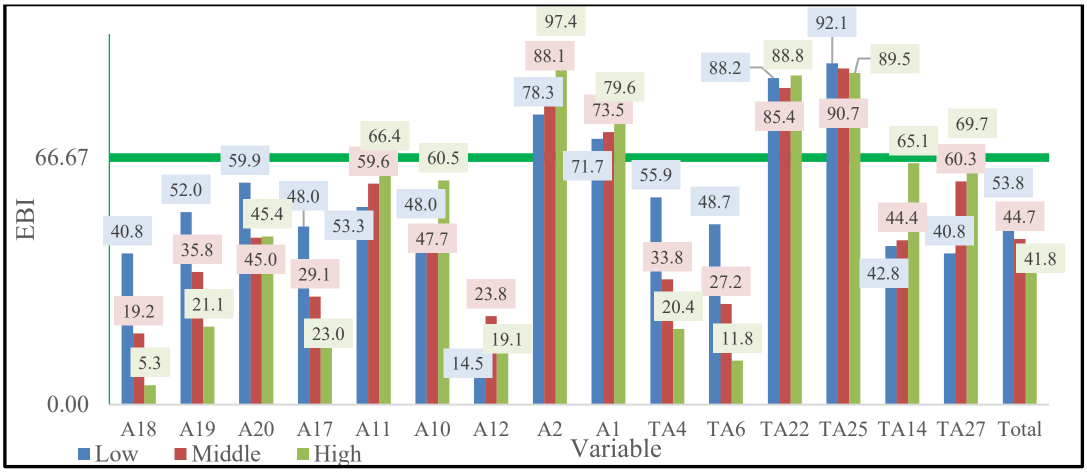
Lifestyle Characteristics		Variables	Transport-friendly	Water-friendly	Littering	Food-friendly	Toilet friendly
1.	Food expenditure	low Middle High	49.90 31.94 22.74	43.81 48.41 55.06	89.72 87.53 89.08	64.99 58.57 56.42	41.99 50.63 66.95
2.	Non-food expenditure	low Middle High	51.66 28.13 24.76	41.94 47.98 57.36	85.38 88.20 92.75	62.95 60.07 56.97	33.57 53.32 72.69
3	Per capita expenditure	low Middle High	42.75 31.71 30.12	44.93 44.57 57.75	90.52 84.09 91.70	63.89 59.29 56.81	43.96 44.55 71.01
4.	Tourism activities	No Yes	35.61 32.48	47.06 61.96	88.37 90.48	60.70 55.16	51.63 60.56
5.	Smoking habits	No Yes	35.84 34.04	52.01 44.38	90.14 86.21	60.41 59.08	54.56 50.10
6.	Internet access	No Yes	35.70 30.58	48.00 59.19	87.52 98.69	60.11 58.24	50.68 72.20

Source: Prepared by the author based on household survey from Fieldwork (2016).

Re non-food expenditure, the respondents with low expenditure are the best environmentally behaved in the transport and food dimensions, while those with High expenditure are the best behaved in the dimensions on water, littering and toilet. In terms of per capita expenditure, the respondents with Low expenditure are the best behaved in the transport and food dimensions, but those with High per capita expenditure behave better than any other expenditure group in the dimensions of water, littering and toilet. Overall, the EBI scores in Table 7.4 show that the people with either low or high expenditure on food, non-food and per capita expenditure are associated with the best environmental behaviour in the respective dimensions; middle expenditure people do not figure in these best behaviour scenarios. It is also notable that the respondents with any level of expenditure in any item are environmentally friendly (EBI greater than 66.67) in the dimension on littering and the respondents with high income/expenditure are environmentally friendly in the toilet dimension (Table 7.4).

Figure 7.9 shows that the respondents with low food expenditure display the best environmental behaviour for eight of the 15 variables. These variables are — disposing of waste in the river/waterways (TA25), littering (TA22), consuming fish/seafood (TA6), consuming chicken (TA4), using public transport (A17), A20 (conducting routine machine check (A20), reducing private transport (A19) and using low carbon fuel (A18). On the other hand, the respondents with high food expenditure show the best environmental behaviour for six variables, namely — having a toilet with septic-tank (TA27), using firewood for cooking (TA14), littering (TA22), consuming local/traditional food (A1), consuming vegetables/fruits (A2), having shorter showers (A10) and saving water while cooking (A11). Respondents with middle level food expenditure perform the best environmental behaviour for the variable — re-using grey water (A12). All the food expenditure groups are environmentally friendly (EBI greater than 66.67) with respect to the variables — disposing of waste in the river/waterways (TA25), littering (TA22), consuming local/traditional food (A1) and consuming vegetables/fruits (A2). In addition, the respondents with high food expenditure are also environmentally friendly (EBI greater than or equal to 66.67) with respect to the variables — having a toilet with septic-tank (TA27) and saving water while cooking (A11). The use of grey water continues to attract the worst environmental behaviour, where all three-food expenditure groups record the lowest EBI (Figure 7.9).

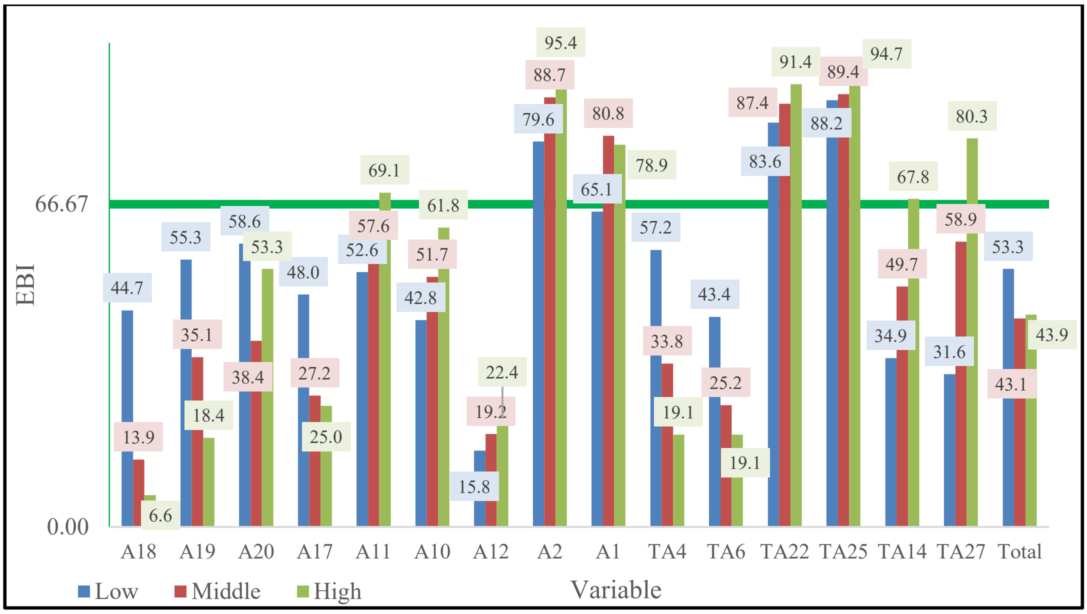
Figure 7.9. EBI by food expenditure for each variable.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

The environmental behaviour for non-food expenditure according to variables is shown in Figure 7.10. The respondents with low non-food expenditure display the best environmental behaviour for six variables — consuming fish/seafood **(**TA6), consuming chicken (TA4), using public transport (A17), conducting routine machine check (A20), reducing private transport (A19) and using low carbon fuel (A18). Those with high non-food expenditure perform environmentally the best with respect to nine variables — having a toilet with septic-tank (TA27), using firewood for cooking (TA14), disposing of waste in the river/waterways (TA25), littering (TA22), A2 (consuming fruits/vegetables), A12 (using grey water), having shorter showers (A10), saving water while cooking (A11) and conducting routine machine check (A20). The non-food expenditure groups displaying environmentally friendly behaviour (EBI equal to or greater than 66.67) at the level of variables consist of high non-food expenditure (variables TA27, TA14, TA25, TA22, A1, A2 and A11), middle level non-food expenditure (variables TA25, TA22, A1 and A2), and low non-food expenditure (variables TA25, TA22, A1 and A2). Using grey water (variable A12) attracts the worst environmental behaviour by all non-food expenditure groups (Figure 7.10).

Figure 7.10. EBI by non-food expenditure for each variable.

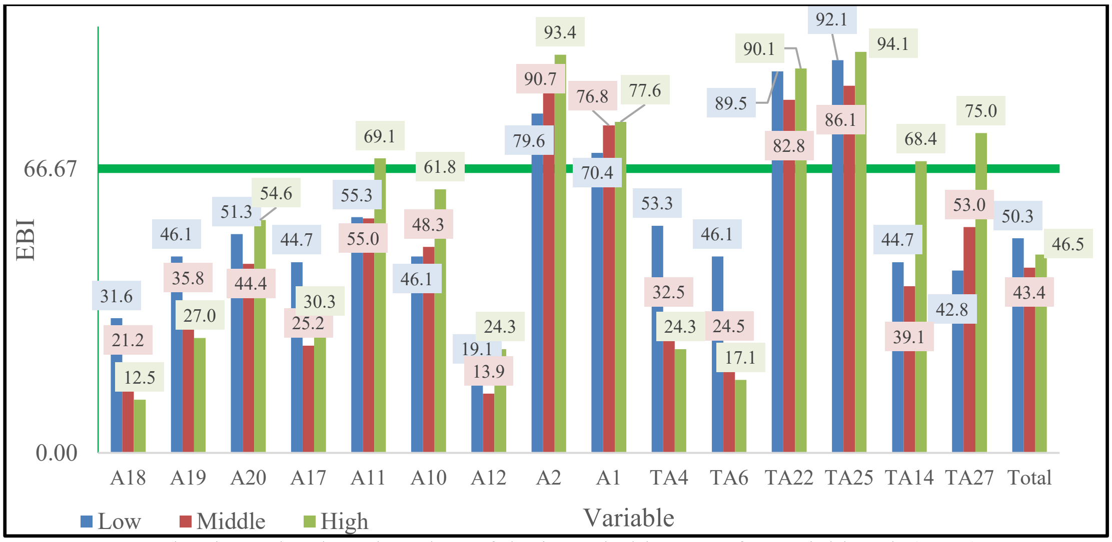


Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

The environmental behaviour for per capita household expenditure according to variables is shown in Figure 7.11. Respondents with high per capita expenditure show the best environmental behaviour for ten variables — having a toilet with septic-tank (TA27), using firewood for cooking (TA14), disposing of waste in the river/waterways (TA25), littering (TA22), consuming local/traditional food (A1), consuming fruits/vegetables (A2), re-using grey water (A12), having shorter showers (A10), saving water while cooking (A11) and conducting routine machine check (A20). Low per capita household expenditure attracts the best environmental behaviour with respect to five variables namely — consuming fish/seafood (TA6), consuming chicken (TA4), using public transport (A17), reducing private transport (A19) and using low carbon fuel (A18).

Respondents of all the household expenditure groups display environmentally friendly behaviour (EBI equal to or greater than 66.67) for the variables — disposing of waste in the river/waterways (TA25), littering (TA22), consuming local/traditional food (A1) and consuming fruits/vegetables (A2); while the respondents with high per capita household expenditure are also environmentally friendly with respect to the variables — having a toilet with septic-tank (TA27), using firewood for cooking (TA14) and saving water while cooking (A11). As observed for other characteristics, re-using grey water attracts the worst environmental behaviour from the respondents of all the household expenditure groups (Figure 7.11).

Figure 7.11. EBI of variables based on per capita expenditure.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

7.2.2.2 ***Tourism***

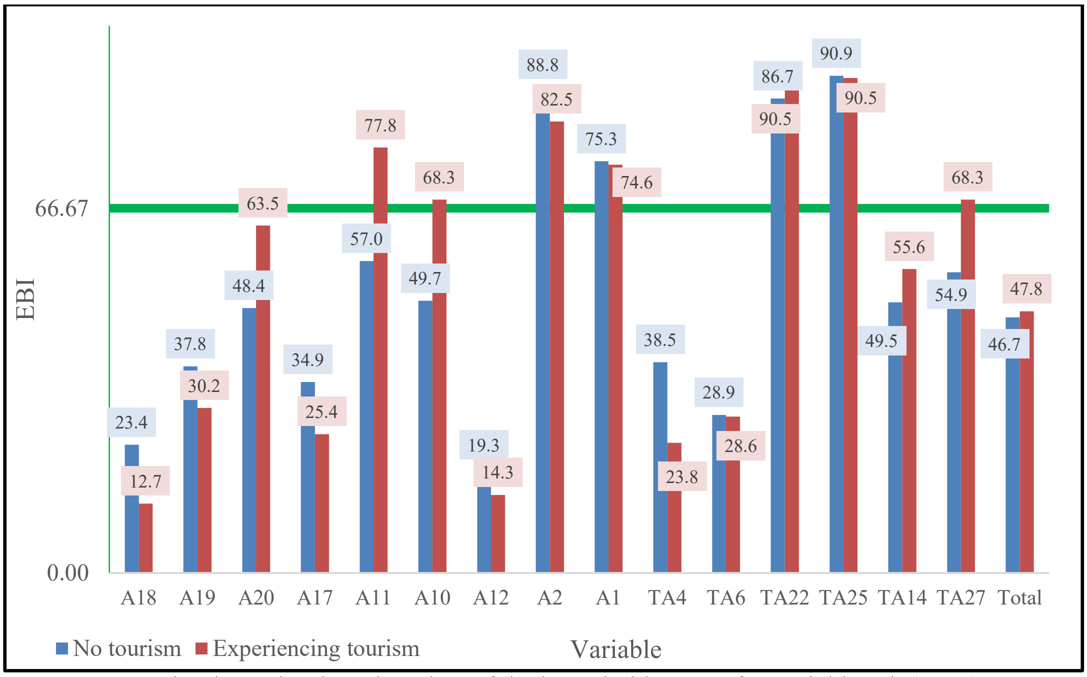
Information about the tourism status of respondents was also obtained from the March 2016 Susenas database. In this survey, the respondents were asked whether or not they had travelled to any tourist spot in the last six months. Based on this information, the respondents' tourism status was categorised into two groups, (i) tourist and (ii) non-tourist depending respectively on whether or not they had done so.

At the macro level, a respondent who has been a tourist in the last six months behaves environmentally slightly better than a respondent who has not been a tourist as indicated by a greater EBI (Table 7.3). However, the difference between the EBI of the two groups is very small, and none of the EBIs indicates environmentally friendly behaviour, as scores are below the friendliness line of 66.67.

Furthermore, the average EBI based on dimensions reveals that the non-tourist respondents perform environmentally better in two dimensions, namely transport and food (Table 7.4). In contrast, the tourist respondents display better environmental behaviour in the other three dimensions, water, littering and toilets. Both the tourist and non-tourist groups are environmentally friendly (EBI greater than 66.67) in the littering dimension.

Furthermore, the average EBI by variables (Figure 7.12) reveals that on average, the respondents with tourism experience display better environmental behaviour for variables — having a toilet with a septic-tank (TA27), using firewood for cooking (TA14), littering (TA22), having shorter showers (A10), saving water while cooking (A11) and conducting routine machine check (A20), while the respondents with no-tourism experience are environmentally better with respect to the variables disposing of waste in the river/waterways (TA25), consuming fish/seafood (TA6), consuming chicken (TA4), consuming local/traditional food (A1), consuming fruits/vegetables (A2), re-using grey water (A12), using public transport (A17), reducing private transport (A19) and using low carbon fuel (A18). Both the groups are environmentally friendly (EBI equal to or greater than 66.67) with respect to the variables — disposing of waste in the river/waterways (TA25), littering (TA22), consuming local/traditional food (A1) and consuming fruits/vegetables (A2). In addition, the tourists are environmentally friendly also with respect to the variables — having a toilet with a septic-tank (TA27), having shorter showers (A10) and saving water while cooking (A11) (see Figure 7.12).

Figure 7.12. EBI of variables based on tourism activities.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

7.2.2.3 ***Smoking***

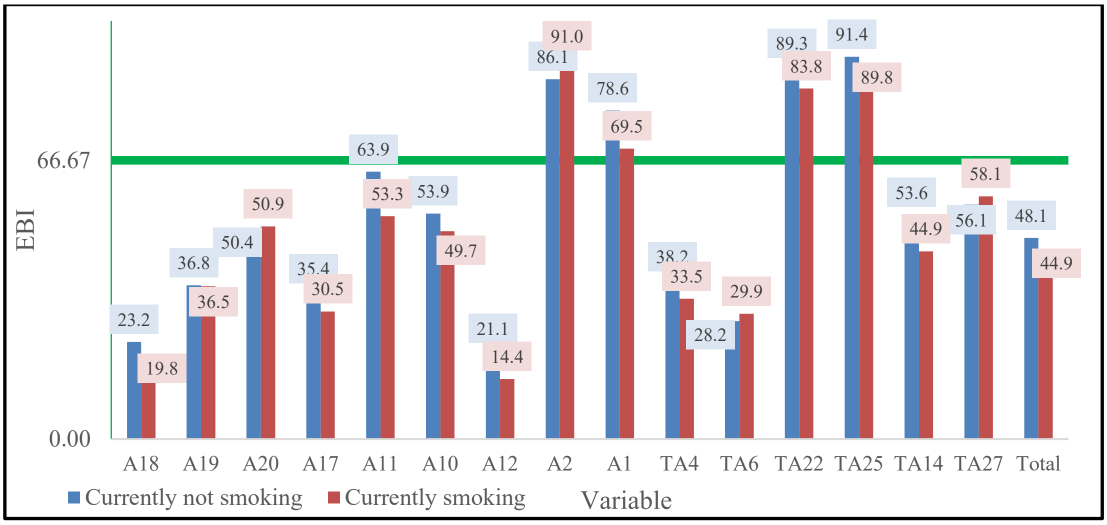
The smoking status of the respondents was ascertained through the following question asked at the March 2016 Susenas: "in the last 1 month, have you ever smoked a cigarette?". Those respondents who answered in the affirmative, then the respondent was affirmative were identified as smokers and if the answer was negative, then the respondent was considered a non-smoker.

The non-smoking respondents show better environmental behaviour than their smoking counterparts as indicated the EBI score (Table 7.3), however neither group is environmentally friendly because their EBIs are less than the friendliness line. The non-smokers also display better environmental behaviour across all dimensions (Table 7.4) and similar to the other characteristics, both the non-smokers and smokers are environmentally friendly (EBI greater than 66.67) with respect to the littering dimension.

The average EBI by smoking status for each variable (Figure 7.13) shows that the non-smoking respondents behave environmentally better with respect to 11 variables, namely —consuming chicken (TA14), disposing of waste in the river/waterways (TA25), littering (TA22), consuming chicken (TA4), consuming local/traditional food

(A1), re-using grey water (A12), having shorter showers (A10), saving water while cooking (A11), using public transport (A17), reducing private transport (A19) and using low carbon fuel (A18). Respondents who are classified as smokers behave environmentally better for the other five variables —having a toilet with septic-tank (TA27), consuming fish/seafood (TA6), consuming fruits/vegetables (A2) and conducting routine machine check (A20). Both the non-smokers and smokers display environmentally friendly behaviour (EBI greater than 66.67) for the variables — disposing of waste in the river/waterways (TA25), littering (TA22), consuming local/traditional food (A1) and consuming fruits/vegetables (A2). Similar to the EBI by other characteristics and dimensions, the variable re-using grey water (A12) attracts the worst environmental behaviour from both the non-smokers and smokers (Figure 7.13).

Figure 7.13. EBI of dimension based on smoking habit.

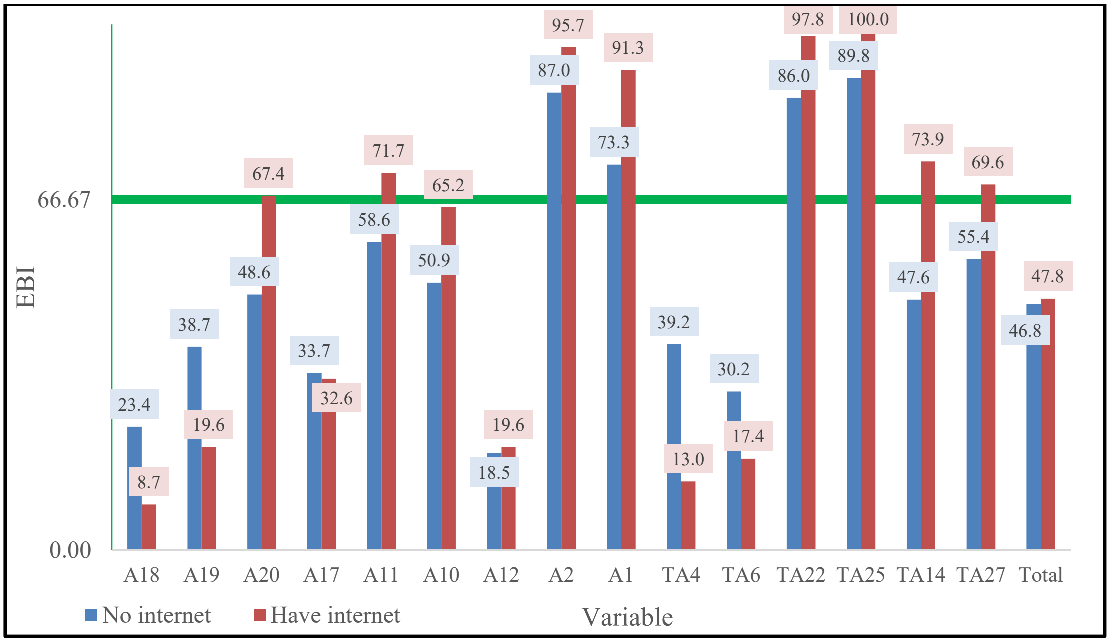


Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

7.2.2.4 ***Internet access***

In the March 2016 Susenas, the respondents were asked: “In the last three months, have you ever accessed the internet (including Facebook, Twitter, BBM, WhatsApp)?”. Based on their answers to this question the respondents were classified in two groups: (i) No (ii) Yes. Those who had accessed the internet are found to show slightly better environmental behaviour than those who had not (Table 7.3), although the difference in their EBI is very small and both are well below the friendliness line. People with no internet access show better environmental behaviour than those with internet access in the dimensions of transport and food (although of course this is correlation and not causation), but the people with internet access are environmentally better behaved in the dimensions of water, littering and toilet. Both the groups are environmentally friendly (EBI greater than 66.67) in the littering dimension and the people with internet access are environmentally friendly in the toilet dimension.

Figure 7.14. EBI of variables based on internet access.



Source: Drawn by the author based on data of the household survey from Fieldwork (2016).

Internet access is associated with better environmental behaviour with respect to ten of the 15 variables: TA27 (having a toilet with septic-tank), TA14 (using firewood for cooking), TA25 (disposing of waste in the river/waterways), TA22 (littering), A1 (consuming local/traditional food), A2 (consuming fruits/vegetables), A12 (re-using grey water), A10 (having shorter shower), A11 (saving water while cooking) and A20 (conducting routine machine check). People with no internet access display better environmental behaviour with respect to the variables TA6 (consuming fish/seafood), TA4 (consuming chicken), A17 (using public transport), A19 (reducing private transport) and A18 (using low carbon fuel). Both the internet access groups are environmentally friendly (EBI greater than 66.67) for the variables — disposing of waste in the river/waterways (TA25), littering (TA22), consuming local/traditional food (A1) and consuming fruits/vegetables (A2), while those with internet access are also environmentally friendly for the variables — having a toilet with septic-tank (TA27), using firewood for cooking (TA14), saving water while cooking (A11) and conducting routine machine check (A20). Re-using grey water continues to attract one of the worst environmental behaviours from both the groups.

7.3 The proportion of EFP and EnFP

Tables 7.1 through to 7.4 and Figures 7.1 through to 7.14 show the average EBI scores of respondents by different characteristics overall, by dimension and by variable, but these average scores are mostly below the friendliness line of EBI equal to 66.67. However, all these EBI scores are averages of the scores which, for some respondents are above the friendliness line and for others below the friendliness line. This section explores the prevalence of friendliness, i.e. the proportions of the Environmentally Friendly People (EFP) and the Environmentally not-friendly People (EnFP) for each demographic and lifestyle characteristic. As explained in Chapter 6, respondents belonging to the EFP and EnFP groups of respondents are distinguished by using a cut-off point, called the friendliness line*,* defined by an EBI equal to 66.67. The cut-off point serves to identify which people can be deemed to be "friendly" or 'unfriendly'.

In order to capture the depth of unfriendliness, this research presents the 'unfriendliness gap' or F_3 for each category. This gap represents the intensity of unfriendliness, which is reflected in the extent to which the score of the EnFP lies below the friendliness line (see Chapter 6). This gap is measured by the difference between the EBI score of the environmentally unfriendly people and the friendliness line expressed as a fraction of the value of the friendliness line. As such, it reflects the total EBI points required by all the respondents below the friendliness line to reach the friendliness line. In other words, if this gap is multiplied by the value of the friendliness line*,* it gives the increase in the mean score of unfriendly households required to eliminate their unfriendliness. This should, of course, be interpreted as the minimum score required, as the elimination of unfriendliness with this "minimum score" would also require it to be "optimally" allocated within the right variable.

Next, to enrich the description of the state of the EFBI at each category, this research also presents the 'severity of unfriendliness (S)', which reflects the degree of inequality among the EnFP. It helps explain how deep the gap between the friendliness line is and the average EBI of the EnFP.

7.3.1 Demographic characteristics

It has been shown in Chapter 6 that according to the definition of the friendliness line (EBI equal to greater than 66.67) a large majority of the respondents interviewed in this study are environmentally unfriendly. Of the 466 respondents sampled in this research, 96 (20.6 percent) are found to be environmentally friendly (EFP) and 370 (79.4 percent) are environmentally unfriendly.

Table 7.5 shows the percentages of environmentally friendly people (EFP) and environmentally not-friendly people (EnFP) for each socioeconomic characteristic. Females are more likely to be environmentally friendly compared with males as nearly a quarter of the females (24.6 percent) are EFP compared with a sixth (16.7 percent) of the males. Respondents from rural areas have a greater propensity to be EFP than those from urban areas. OKUS has proportionately more EFP than any other regency/city. Surprisingly lower education appears to foster more EFP compared with higher education, as education below junior high school level has a larger proportion of EFP than junior high school or higher levels of education. Smaller households (with four or fewer residents) have a larger proportion of EFP than larger households. Older respondents (51 years and older) have more EFP than their younger counterparts. Proportionately there are more EFP among non-migrants than migrants and agricultural occupations appear to foster more EFP than non-agricultural occupations (Table 7.5).

Following the definitions of the unfriendliness gap and severity of unfriendliness given earlier in this section, Table 7.6 shows these two measures according to demographic and lifestyles characteristics.

Table 7.5. Proportion of EFP and EnFP based on socioeconomic characteristics.

Demographic characteristics		Variables	EFP (%)	EnEP (%)	Total (%)
1.	Sex	Male Female Total (%)	16.67 24.57 20.60	83.33 75.43 79.40	100.00 100.00 100.00
2.	Urban/Rural	Urban Rural Total (%)	19.31 21.18 20.60	80.69 78.82 79.40	100.00 100.00 100.00
3.	Regency	OKI Lahat MUBA OKUS Palembang Total (%)	18.45 25.29 14.77 27.50 18.52 20.60	81.55 74.71 85.23 72.50 81.48 79.40	100.00 100.00 100.00 100.00 100.00 100.00
4.	Education	Less than Junior High School Junior High School and Above Total (%)	23.99 14.71 20.60	76.01 85.29 79.40	100.00 100.00 100.00
5.	Household size	≤ 4 >4 Total (%)	23.03 14.71 20.60	76.97 85.29 79.40	100.00 100.00 100.00
6.	Age	Younger (18–39 years) Middle (40–50 years) Older (51 years and older) Total (%)	14.09 20.26 26.83 20.60	85.91 79.74 73.17 79.40	100.00 100.00 100.00 100.00
7.	Migration	Non-migrant Permanent Migrant Total (%)	21.71 17.48 20.36	78.29 82.52 79.64	100.00 100.00 100.00
8.	Employment	Non-agricultural Agricultural Total	17.52 23.15 20.96	82.48 76.85 79.04	100.00 100.00 100.00

Source: Prepared by the author based on household survey from Fieldwork (2016).

Table 7.6. The friendliness and the severity gap based on demographic characteristics.

Demographic and lifestyles characteristics	Unfriendliness Gap	Severity of Unfriendliness
a. Gender		
Male	0.35	0.18
Female	0.31	0.16
b. Location		
Urban/Rural		
Urban	0.30	0.14
Rural	0.34	0.19
Regions		
OKI	0.39	0.23
Lahat	0.28	0.15
MUBA	0.33	0.16
OKUS	0.36	0.21
Palembang	0.29	0.13
c. Education		
Less than Junior High School	0.32	0.17
Junior High School and above	0.34	0.18
d. Household Size		
≤4	0.30	0.16
>4	0.35	0.18
e. Age		
Young (18–39 years)	0.35	0.19
Middle (40–50 years)	0.36	0.19
Older (51 years and over)	0.26	0.13
f. Employment		
Non-agricultural	0.33	0.16
Agricultural	0.34	0.19
g. Migration Status		
Non-migrant	0.33	0.17
Migrant	0.34	0.18

Source: Prepared by the author based on household survey from Fieldwork (2016).

The unfriendliness gap is slightly greater among males than females, which is consistent with the fact that the average EBI among males is lower than that of females. The gap is greater among rural respondents than their urban counterparts and among higher educated people than lower educated people respondents, which also appears to be consistent with the greater average EBI of urban respondents and lower educated people. In addition, the gap is also greater among larger households, middle-aged people, agricultural workers and migrants. In the regencies/city, the gap is the largest for OKI.

The severity of unfriendliness is consistent with the unfriendliness gap for each of the demographic and socioeconomic characteristic (see the second and third columns of Table 7.6).

7.3.2 **Lifestyle characteristics**

Table 7.7 shows the percentages of environmentally friendly people (EFP) and environmentally not-friendly people (EnFP) for each lifestyle characteristic.

Table 7.7. Proportion of EFP and EnFP based on the characteristics of lifestyles.

Lifestyle characteristics		Level	EFP (%)	EnEP (%)	Total (%)
1.	Food expenditure	Low	37.50	62.50	100.00
		Middle	17.88	82.12	100.00
		High	5.92	94.08	100.00
		Total	20.44	79.56	100.00
2.	Non-food expenditure	Low	39.47	60.53	100.00
		Middle	13.25	86.75	100.00
		High	8.55	91.45	100.00
		Total	20.44	79.56	100.00
3	Per capita household expenditure	Low	30.26	69.74	100.00
		Middle	16.56	83.44	100.00
		High	14.47	85.53	100.00
		Total	20.44	79.56	100.00
4.	Tourism activities	Non-tourist	21.61	78.39	100.00
		Tourist	12.70	87.30	100.00
		Total	20.36	79.64	100.00
5.	Smoking habit	Non-smoker	22.50	77.50	100.00
		Smoker	16.77	83.23	100.00
		Total	20.36	79.64	100.00
6.	Internet access	No	21.45	78.55	100.00
		Yes	10.87	89.13	100.00
		Total	20.36	79.64	100.00

Source: Prepared by the author based on household survey from Fieldwork (2016).

Low expenditure on food, non-food items and on overall household matters appear to be more conducive to environmentally friendly behaviour compared with the middle and high expenditure groups, as the proportion of EFP is the largest in the low expenditure group on all three items (Table 7.7). On the other hand, people with high expenditure have the smallest proportion of EFP. Further, being a tourist appears to foster less environmentally friendly behaviour than not being a tourist as the percentage of EFP is smaller among the tourists. People with smoking habits and people with internet access appear to be less friendly to the environment, as the percentage EFP is smaller in both of these groups compared with their respective counterparts (Table 7.7).

Table 7.8 shows the unfriendliness gap and severity of unfriendliness according to lifestyle characteristics. Respondents belonging to the higher expenditure group (middle to high) in food, non-food and household items have a deeper unfriendliness gap and larger severity of unfriendliness. Non-tourists, smokers and respondents with no internet access are associated with a greater unfriendliness gap and stronger severity of unfriendliness.

Table 7.8. Proportion of EFP and EnFP based on the characteristics of lifestyles.

Lifestyle characteristics		Level	Unfriendliness Gap	Severity of unfriendliness
1.	Food expenditure	low Middle High	 0.36 0.38	0.14 0.20 0.19
2.	Non-food Expenditure	low Middle High	0.27 0.37 0.36	0.16 0.20 0.18
3	Per capita household expenditure	low Middle High	0.30 0.38 0.32	0.16 0.21 0.16
4.	Tourism activities	Non-tourist Tourist	0.33 0.30	0.18 0.14
5.	Smoking habit	Non-smoker Smoker	0.32 0.35	0.17 0.19
6.	Internet access	No Yes	0.33 0.30	0.18 0.14

Source: Prepared by the author based on household survey from Fieldwork (2016).

7.4 The distribution of environmentally friendly and not-friendly people by demographic and lifestyle characteristics

In the previous section the percentages of environmentally friendly people (EFP) and environmentally not-friendly people (EnFP) for each demographic, socioeconomic and lifestyle characteristic were presented with a view to finding out which groups of each characteristic were more conducive to environmentally friendly behaviour (see Table 7.7 and 7.8). There is another way of looking at EFP and EnFP, which is by examining the distribution of these two measures according to each demographic and lifestyle characteristics as presented in Tables 7.9 and 7.10.

Table 7.9. Distribution of EFP and EnFP by demographic and socioeconomic characteristics.

Demographic Characteristics		Variables	EFP (%)	EnEP (%)
1.	Sex	Male	40.63	52.70
		Female	59.38	47.30
		Total (%)	100.00	100.00
2.	Urban/Rural	Urban	29.17	31.62
		Rural	70.83	68.38
		Total (%)	100.00	100.00
3.	Regency	OKI	19.79	22.70
		Lahat	22.92	17.57
		MUBA	13.54	20.27
		OKUS	22.92	15.68
		Palembang	20.83	23.78
		Total (%)	100.00	100.00
4.	Education	Below Junior High School	73.96	60.81
		Junior High School and above	26.04	39.19
		Total (%)	100.00	100.00
5.	Household Size	<4	53.13	37.30
		≥4	46.87	62.70
		Total (%)	100.00	100.00
6.	Age	Younger (18–39 years)	21.88	34.59
		Middle (40–50 years)	32.29	32.97
		Older (51 years and over)	45.83	32.43
		Total (%)	100.00	100.00
7.	Migration	Non-migrant	72.53	66.85
		Migrant	27.47	33.15
		Total (%)	100.00	100.00
8.	Employment	Agricultural	47.92	55.14
		Non-agricultural	52.08	44.86
		Total (%)	100.00	100.00

Source: Prepared by the author based on household survey from Fieldwork (2016).

More than one-half (59%) of the environmentally friendly people identified in this research are women, and a very large majority (71%) live in rural areas. The EFP are distributed fairly uniformly among the regencies/city except that more than a fifth (22.9%) live in Lahat and OKUS and only 13.5 % live in MUBA. Nearly three-quarters (74%) of the EFP have fewer than nine years of education (less than Junior High School). A little over half (53%) come from smaller-sized households (fewer than 4 members), but nearly 46% of the EFP are older than 50 years. Non-migrants comprise nearly three-quarters (73%) and people in non-agricultural occupations constitute more than one-half (52%) of the environmentally friendly people (see Table 7.9).

In terms of lifestyle characteristics (Table 7.10) most, (more than 60%), of the environmentally friendly people (EFP) belong to the group with a low range of expenditure on food and non-food items. Even for overall household expenditure, nearly one-half of the EFP belong to the low expenditure range, followed by the middle and high range in that order. More than 90% of the EFP are tourists and more than 69% are smokers. More than three-quarters (78.6%) of the EFP are not internet users.

Table 7.10. Distribution of EFP and EnFP by lifestyle characteristics.

Lifestyles characteristics		Variables	EFP (%)	EnEP (%)
1.	Food expenditure	Low Middle High Total	61.29 29.03 9.68 100.00	26.24 34.25 39.50 100.00
2.	Non-food expenditure	Low Middle High Total	64.52 21.51 13.98 100.00	25.41 36.19 38.40 100.00
3	Per capita household expenditure	Low Middle High Total	49.46 26.88 23.66 100.00	29.28 34.81 35.91 100.00
4.	Tourism activities	Non-tourist Tourist Total	8.79 91.21 100.00	78.39 21.61 100.00
5.	Smoking habit	Non-smoker Smoker Total	30.77 69.23 100.00	39.04 60.96 100.00
6.	Internet access	No Yes Total	78.55 21.45 100.00	5.49 94.51 100.00

Source: Prepared by the author based on data of the household survey from Fieldwork (2016) and of Susenas of March 2016.

7.5 Conclusion

This chapter further explores the environmental behaviour and the environmental behaviour index (EBI) in South Sumatra with respect to demographic and lifestyle factors. Based on this investigation, this chapter seeks to unravel who the EFP and the EnFP people are in this case study. In addition, the chapter also seeks to reveal the state of the environmentally friendly and environmentally unfriendly groups and to identify the dimensions and variables with respect to which the prevalence of environment-unfriendliness occurs the most. Table 7.11 provides a summary of the environmental behaviour index (EBI) for each classification of the demographic and socioeconomic characteristics and determines their level of friendliness/unfriendliness based on the value of the EBI.

Table 7.11. Environmental behaviour based on demographic and socioeconomic characteristics.

Demographic characteristics	The performance			Headcount ratio	
	EBI	Classification		Proportion of unfriendly people	Classification within group
		Compared to friendliness line (FL)	Within group		
a. Gender		Unfriendly			
Male	45.23	Unfriendly	More unfriendly	83.33	More unfriendly
Female	48.62	Unfriendly	Less unfriendly	75.43	Less unfriendly
b. Location Urban/Rural		Unfriendly Unfriendly			
Urban	48.70	Unfriendly	Less unfriendly	80.69	More unfriendly
Rural	46.11	Unfriendly	More unfriendly	78.82	Less unfriendly
Regency/City					
OKI	42.34	Unfriendly	More unfriendly	81.55	
Lahat	50.48	Unfriendly	Least unfriendly	74.71	
MUBA	46.11	Unfriendly		85.23	More unfriendly
OKUS	46.00	Unfriendly		72.50	Less unfriendly
Palembang	49.75	Unfriendly		81.48	
c. Education		Unfriendly			
Lower (Less than Junior High School)	47.81	Unfriendly	Less unfriendly	76.01	Less unfriendly
Higher (Junior High School or higher)	45.36	Unfriendly	More unfriendly	85.29	More unfriendly
d. Household Size		Unfriendly			
Small (<4)	47.89	Unfriendly	Less unfriendly	76.97	Less unfriendly
Large (≥4)	44.56	Unfriendly	More unfriendly	85.29	More unfriendly
e. Age					
Young (18–39 years)	44.47	Unfriendly	More unfriendly	85.91	More unfriendly
Middle (40–50 years)	45.08	Unfriendly		79.74	
Older (51 years and older)	50.86	Unfriendly	Least unfriendly	73.17	Less unfriendly
f. Employment		Unfriendly			
Non-agricultural	46.55	Unfriendly	Less unfriendly	82.48	More unfriendly
Agricultural	46.52	Unfriendly	More unfriendly	76.85	Less unfriendly
g. Migration Status		Unfriendly			
Non-migrant	47.39	Unfriendly	Less unfriendly	78.29	Less unfriendly
Migrant	45.82	Unfriendly	More unfriendly	82.52	More unfriendly

Source: Prepared by the author based on data of the household survey from Fieldwork (2016) and of Susenas of March 2016.

In addition, Table 7.12 shows that none of the demographic and socioeconomic characteristics is associated with an environmentally friendly behaviour (EFB), as the

EBI of all these characteristics is below the friendliness line of EBI 66.67. However, in each of the seven demographic and socioeconomic categories being investigated here, the less unfriendly (‘lesser of the two evils’) are the women, urban residents, residents of Lahat, people with lower levels of education, people living in smaller-sized households, the oldest people, people engaged in non-agricultural occupations and the non-migrants (see Table 7.12).

Table 7.12. Environmental behaviour based on lifestyle characteristics.

Lifestyles characteristics	The performance			Headcount Ratio	
	EBI	Classification		Proportion of unfriendly people	Classification within group
		Compared to friendliness line (FL)	Within group		
a. Food expenditure					
Lower	53.76	Unfriendly	Less unfriendly	62.50	Less unfriendly
Middle	44.70	Unfriendly	More unfriendly	82.12	More unfriendly
Higher	41.78	Unfriendly		94.08	
b. Non-food expenditure					
Lower	53.29	Unfriendly	Less unfriendly	60.53	Less unfriendly
Middle	43.08	Unfriendly	More unfriendly	86.75	More unfriendly
Higher	43.86	Unfriendly		91.45	
c. Per capita household expenditure					
Lower	50.32	Unfriendly	Less unfriendly	69.74	Less unfriendly
Middle	43.42	Unfriendly	More unfriendly	83.44	More unfriendly
Higher	46.49	Unfriendly		85.53	
d. Tourism					
Non-tourist	46.73	Unfriendly	More unfriendly	78.39	Less unfriendly
Tourist	47.84	Unfriendly	Less unfriendly	87.30	More Unfriendly
e. Smoking habit					
Non-smoker	48.09	Unfriendly	Less unfriendly	77.50	Less unfriendly
Smoker	44.88	Unfriendly	More unfriendly	83.23	More unfriendly
f. Internet Access					
No internet	46.78	Unfriendly	More unfriendly	78.55	Less unfriendly
Internet	47.83	Unfriendly	Less unfriendly	89.13	More unfriendly

Source: Prepared by the author based on data of the household survey from Fieldwork (2016) and of Susenas of March 2016.

Similar to demographic and socioeconomic characteristics, no lifestyle characteristic is associated with environmentally friendly behaviour, as the EBI of each category of each lifestyle characteristic is below the friendliness line of EBI 66.67 see Table 7.12). However, the lesser environmentally unfriendly respondents are those with the lowest expenditure on food, non-food and household items, the respondents who have had previous tourism experience, the non-smokers and those with internet access (see Table 7.12).

To understand why people behave with the environment the way they do, the next chapter will explore insights from qualitative data. Drawing on an open question of the household survey, and the results of the focus group discussions (FGDs), the next chapter unravels the people's perception of the environment, as well as the attitudes, norms and barriers that hinder them from adopting an environmentally friendly behaviour (EFB).

CHAPTER: 8 INSIGHT FROM QUALITATIVE DATA

8.1 Introduction

Chapters 4, 5, 6 and 7 contain discussions of the findings from the analysis of quantitative data derived from the secondary data, the household survey (HS) and the combined HS with March 2016 Susenas. These findings reveal how the respondents in this province were performing poorly with regard to EB. The purpose of this chapter is to explore the experiences of the people of South Sumatra in adopting good environmental behaviour in their daily life, and to gain in-depth knowledge about the persistence of attitudes, subjective norms and barriers that hinder people from practising good environmental behaviour and the reasons thereof. To do this, the present chapter discusses how the respondents define environmentally friendly behaviour (EFB) in their own words, their attitudes and norms in relation to the adoption of EFB so that one can identify the barriers which affect their decision to adopt or not adopt EFB in their daily life.

This discussion draws on two primary sources. The first source is one qualitative question in the HS, which asked the respondents about how they defined environmentally firendly behaviour. The second source comprises 10 focus group discussions (FGDs) with representatives of households that were conducted in South Sumatra along with the HS during August–October 2016. In this chapter, information from the HS is analysed to explore the perceptions of respondents in relation to EFB, while information from the FGDs is used to analyse their attitudes, norms, and barriers towards EFB. This has been done by applying the NVivo software on the qualitative data obtained through focus group discussions in each regency/city.This chapter also identifies possible drivers of the perception, attitudes, norms and barriers that hinder the adoption of EFB in this region.

8.2 Description of participants

The respondents who participated in the FGDs were drawn from among the women and men representing the heads of household who were selected as the FGDs'samples. Their educational background is varied, ranging from primary school to university education (see Table 8.1). As it is mentioned in Chapter 3, this research held ten FGDs in five regencie/city in South Sumatra. In every regency/city, FGDs were held separately for female and male responders so that there were two FGDs conducted in each sampled regency/city.

Previous studies mentioned that group discussions can deliver a more qualified output if their participants have simmilar characteristics because all particpants from a homogeneous group can comfortably open up with each other and speak out (Keown, 1983; Krueger, 2009). Hence, to allow the discussion flow naturally, we decided to invite people from the same education background in each of the FGDs. Furthermore, considering the variety in South Sumatra's socioeconomic as well as South Sumatra's widespread areas we decided that all FGDs should have representatives from urban and rural areas, and from low and high educational background. According to BPS Provinsi Sumatera Selatan (2015a, p. 91), approximately 70% of South Sumatra's population was graduated from junior high school — JHS or below. However, as we want to also get insight from respondents from higher education levels, then we decided to also include respondents with SHS — senior high schools and University educational background. According to BPS Provinsi Sumatera Selatan (2015a, p. 91), compared to the other four regencies/city under study, Palembang has the largest proportion of people with university educational background, as such we decided to conduct FGDs with respondents graduated from university in Palembang. Base on similar reasons, we decided to conduct FGDs with respondents graduated from JHS or less in OKI and OKUS; and with respondents graduated more than JHS up to SHS in MUBA and Lahat. Furthermore, we also decided to conduct FGDs in rural areas in OKI, OKUS and Lahat, and in urban areas in MUBA and Palembang.

As it is mentioned in Chapter 3, the targeted sample for all FGDs was 100 respondents equally distributed among the males and females. However only 77 respondents in total were able to come to the group discussions of whom 39 were female and 38 male. The distribution of the FGD participants and the locations are shown in Table 8.1.

Table 8.1. The characteristics of the FGDs respondents.

Regency/ City	Sex	Number of respondents		Education	Urban /rural	Location	Date of the FGD
		I Invited	Attended				
MUBA	Male	10	8	SHS	Urban	*Kayuara* Ward	October 7, 2016
	Female	10	8				
OKI	Male	10	8	JHS	Rural	*Anyar* Village	October 10,2016
	Female	10	8				
OKUS	Male	10	8	JHS	Rural	*Bumijaya* Village	October 13, 2016
	Female	10	8				
Palembang	Male	10	6	University	Urban	*20-Ilir* Ward	October 14, 2016
	Female	10	7				
Lahat	Male	10	8	SHS	Rural	*Pagarnegara* Village	October 17, 2016
	Female	10	8				
Total	Male	50	38				
	Female	50	39				
	Total	100	77				

Note: SHS = Senior High School (Year 12) or above but below Diploma 3; JHS = Junior High School/Less than SHS and below; University = Diploma III and above.
Source: FGDs from Fieldwork (2016).

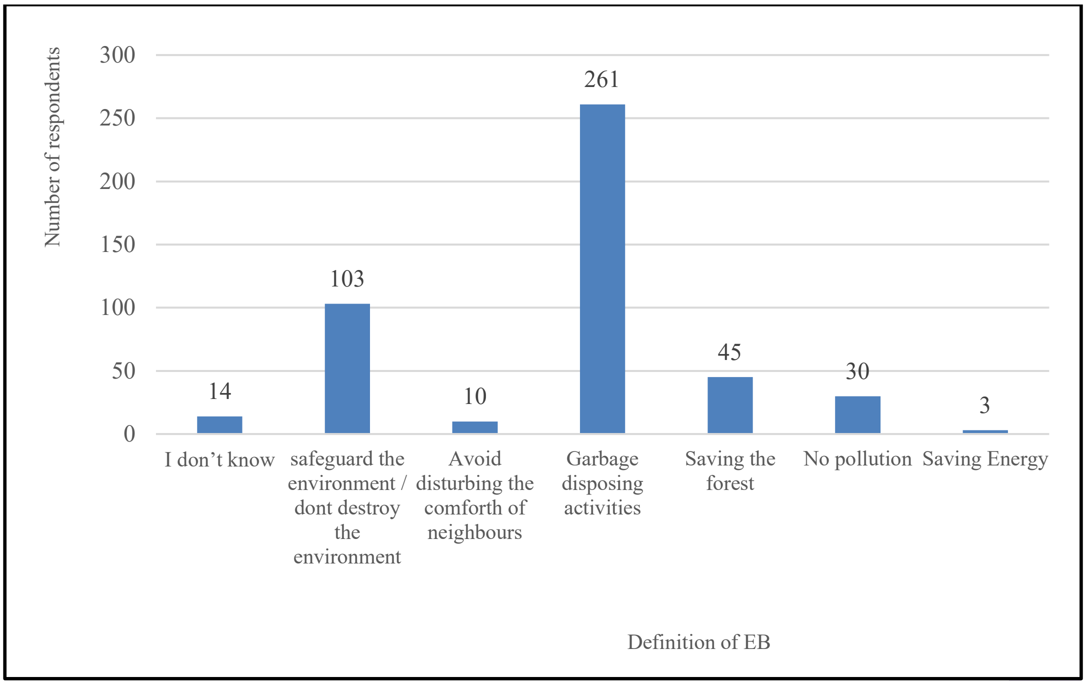
8.3 **How the respondents defined EFB**

Chapter 3 has discussed the breadth of the concept of environmental behaviour and how people often frame the concept into various terminology. The data presented in this section of the chapter provide insight into the respondents' perception of Environmentally Friendly Behaviour (EFB).

The majority of the Household Survey respondents discussed in Chapter 3 were able to define the concept of EFB in their own words. Only 14 out of the total of 466 respondents replied "I don't know" or "I don't understand" when they were asked "how do you define EFB in your daily life?". All these 14 respondents have education below senior high school (SHS) level, which may be a reflection of the predominance this educational level in the total sample, where 94% of the respndents have education below SHS (see Chapter 5).

The rest of the respondents in the HS were able to define the concept of EFB in their own words. As the question format is open-ended, the answers given are varied. All answers can however be grouped into six themes, i.e. (i) behaviour to safeguard the environment, (ii) to avoid disturbing the comfort of our neighbours, (iii) to dispose of garbage correctly, (iv) to save the forest, (v) to create no pollution and (vi) to save energy. Out of those EFB themes the majority (more than 50%) of the respondents described EFB in relation to garbage disposal activities (see Figure 8.1). Most of their definitions of EFB included words such as: "keeping the cleanliness," or "do not litter," or "cleaning the drains," or "do not dispose of the garbage into the river". Around one-fifth of the HS respondents (22.1%) defined EFB in terms of broader concepts, such as "activities to safeguard the environment" or "action that will not destroy the environment" or "action to preserve the natural environment" (see Figure 8.1).

Figure 8.1. Numbers of respondents of HS based on their definition of EFB.



Source: Prepared by the author based on data of the household survey from Fieldwork (2016).

As for the information gathered from the FGD, in many ways the results of FGDs, analysed with the NVivo softaware correspond to those of the HS. The key messages obtained from this analysis are given in Tables 8.2 through 8.8.

Quotes 1a and 1b in Table 8.2 defined EFB as activities related to "not littering", which is undoubtedly associated with garbage disposal activities. As with other villagers in *Pagarnegara*, these two respondents faced garbage disposal problems in their daily life.

Table 8.2. Respondents' perception of EFB.

No.	Quote	Key Message
1.a. b.	"For example, do not litter." (*Pagarnegara*, Woman, SHS). "As far as I know, behaving environment-friendly means do not litter arbitrary. Do not defecate in the river." (*Pagarnegara*, Woman, SHS).	Not littering
2.	"In my opinion, this environmental problem is closely related to waste management. People already understand about the importance of maintaining environmental cleanliness. Although indeed, there are still some residents who still do not understand the importance of maintaining cleanliness." (*Pagarnegara*, Man, SHS).	Waste management
3.	"In my opinion, the environmentally friendly activity is an activity related to '*gotong-royong*' or together to maintain the cleanliness. Or, to plant trees. However, currently reforestation is difficult to be adopted. As people prefer to sell their land, how could it be possible to plant trees?" (*Pagarnegara*, Man, SHS).	Mutual co-operation called '*gotong-royong'* is necessary for EFB
4.	"I think so, my standards are cleanliness, and I am pretty clean. The important thing is that my house is clean, our environment is also clean. Our landfill is also close, [it's] in the market." (*20-Ilir*, Woman, University).	Waste management
5.a. b.	"In my opinion, the term has something to do with pollution. That is, we reduce pollution. Honestly, I personally still have lack of knowledge about the meaning of environmentally friendly. Right now, every morning, I have to take the kids to school. The road is already jammed. I should only walk to take my kids to school, to avoid air pollution. But I have limited time, so, I drive the children by our private car. Automatically, the activity to transport my children, increases the pollution." (*20-Ilir*, Man, University). "I think it is about limiting the use of substances or materials that can damage the environment. Such as the use of AC, and the use of smoky vehicles." (*20-Ilir*, Man, University).	Avoid pollution, less traffic jam

Source: FGDs from Fieldwork (2016).

During FGDs, we found that there was no official temporary landfill or garbage collection in *Pagarnegara*. People usually throw their garbage in several open dumps in their village. The open dumping areas are mostly located near the village street (see Figure 4.23 in Chapter 4), however in this case the locations were further away from the neighbourhood. Some other open dumping areas were located close to *Ayek Apul*, a small river crossing their village (see Figure 8.2). The garbage was all thrown in open dumping spots without being sorted. The lack of official garbage collection facilities forces people to depend mostly on nature such as rain, to solve the bulk of waste alongside the open dumping close by *Ayek Apul*. Other than that, residents also rely on volunteers, who, usually live close by the open dumping areas and would work together through a mutual co-operation activity called *gotong-royong* to burn the bulk of the waste at the open dumping spots or by cleaning the residential garbage in the drains. *Gotong-royong* is an Indonesian term for voluntarily working together. Figure 8.3 illustrates an activity of *gotong-royong* to clean the garbage in a river.

Figure 8.2. A view of *Ayek Apul* in *Pagarnegara*, Lahat.

Source: Google (2015d).

Figure 8.3. An example of *gotong-royong*: People were working together to clean a river in OKI, South Sumatra in 2019.

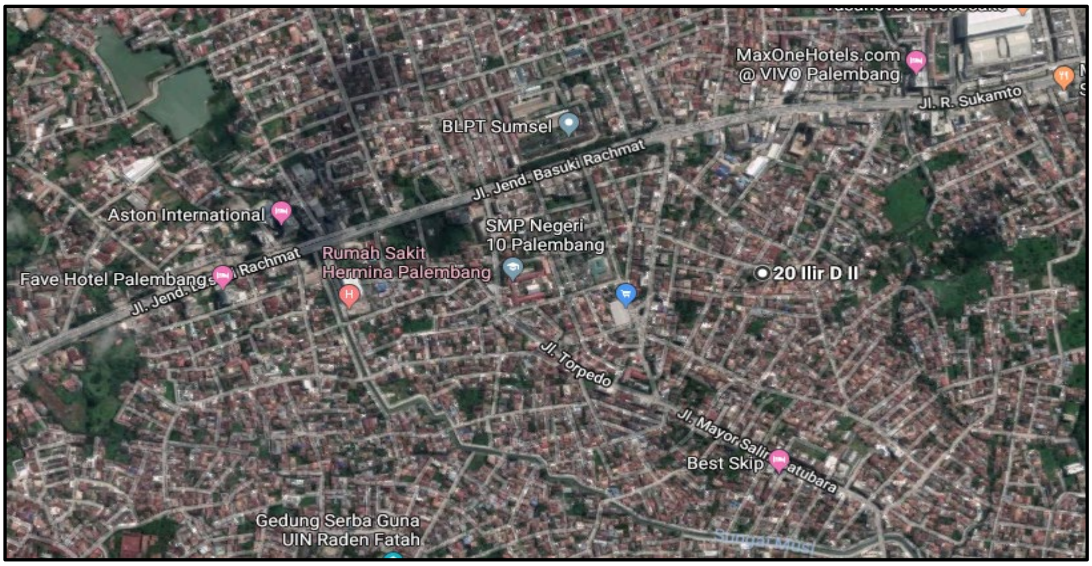
Source: Hermidi (2019).

In quote 3 Table 8.2 a respondent related *gotong-royong* to not only garbage disposal but also to activities to plant trees. However, reforestation is at odds with the trend of land selling business, which according to the respondents in Pagarnegara has grown in Lahat Regency in the last five years or so. This is confirmed by Sahara (2013), who stated that this business has been growing as a side effect of government efforts to develop massive road infrastructure and cheap housing (Sahara, 2013). People started dividing their ancestral heritage or plantation land into smaller-sized land which currently does not give them sufficient economic incentives, and they sell the divided land for housing settlements. The growth of this business has occurred not only in *Lahat* Regency, but in other regencies of South Sumatra (see Siska, 2018).

Defining environmental behaviour in terms of waste management was done not only in rural areas such as *Pagarnegara*., but in other places such as *20-Ilir* where a respondent defined environmental behaviour in a similar manner (see quote 4 in Table 8.2). *20-Ilir* is located close to Palembang city centre (see Figure 8.4). This ward has an official garbage collection on-site, but the service does not go door-to-door. The garbage collection was centred on a temporary disposal site, known locally as *tempat penimbunan sementara* (TPS) in *20-Ilir* market or (see Figure 4.23 in Chapter 4). This garbage bin is not only intended to accommodate residents' garbage, but also waste generated in the market.

Other than garbage, respondents at FGDs also define EFB as actions to reduce the negative externalities of transportation. In quote 5 Table 8.2 the respondents defined EFB as activities related to limiting air pollution and traffic jams caused by transport.

Figure 8.4. A view of *20-Ilir*, Palembang, from google maps.



Source: Google (2019).

8.4 **Attitude, norms and barriers towards EFB**

Chapter 2 showed that psychological variables play important roles in understanding environmental behaviour. Some of these variables include attitude, subjective norms and perceived behavioural control suggested by TPB - the theory of planned behaviour (Ajzen, 1991). The FGDs revealed several types of attitude, subjective norms and perceived behavioural control aspects that influence the decisions of respondents in adopting EFB. This section presents these findings.

8.4.1 **Common attitudes towards EFB**

Table 8.3. Respondents' attitude related to EFB.

No.	Quote	Key message
1.a.	"I will never dare to throw garbage in a clean place, but if someone already throws it there, then I dare to throw garbage over there." (*Bumijaya*, Woman, JHS).	Imitating EnFB
2.a. b. c.	"Somebody will separate it in the public garbage dump. That's the scavengers' job." (*20-Ilir*, Man, University). "I often see people still throwing garbage in the river, but I cannot reprimand them. Who am I, what am I to have such an authority to rebuke them? So, sometimes I am confused. We intend to rebuke, but then in the end we are afraid that it will end in conflict with that person." (*20-Ilir*, Man, University). "These matters should be the government's job. At first, help people to understand why they should throw garbage in the correct place. So, there should be somebody to mobilise people from the top." (*Pagarnegara*, Male, SHS).	EFB is beyond my responsibilities.
3.a. b.	"If there are lights that are still on, at night, I'm taking care it. That's a man's job." (*20-Ilir*, Man, University). "Well, I don't know. I only ride them. It's my husband who takes care of the maintenance of the vehicle."(*20-Ilir*, Woman, University).	Some jobs are for men, some others are for women
4.a. b. c. d.	"Environmentally not-friendly behaviour is more efficient, more practical. Public transport is not practical. I can be late if I use it [public transport]." (*Kayuara*, Woman, JHS). "Building a toilet over the river will let the dirt go to the river directly, it's more practical." (*Pagarnegara*, Woman, SHS). "I live near the river. I burn dry rubbish. I throw wet rubbish into the river while I am washing all the dishes." (*Anyar*, Woman, JHS). "There are still many people who have tap water, but they are still washing their clothes in the river. They said it is very comfortable and more practical. They can wash the clothes faster, as the water is flowing." (*Kayuara*, Woman, SHS).	EFB is complex, not practicable, not efficient nor comfortable
5.a. b. c.	"People are busy. They have more important work to do [than planting a tree in the yard]." (*Pagarnegara*, Woman, JHS). "The smoke [from garbage burning] is not a lot. The garbage is only a little." (*Bumijaya*, Woman, JHS). "For me, I feel it is such a waste activity. If only me, for example, who is separating, while most people don't, it's useless. I once separated my garbage from home, but when I saw it in the garbage box, it turns out that people before me, are still throwing away the mixed garbage. Then I never separated the garbage again." (*Kayuara*, Man, SHS).	EFB is such unnecessary activities or not as urgent as other activities, whereas EnFB is just a tiny insignificant matter.
6.a.	"Riding public transport is less convenient. We often experience traffic jams. Thus, it takes longer time to get to the destination. Because public transport needs a longer time to gather for full passengers. It's faster and saves time to use your own motorcycle." (*20-Ilir*, Woman, University).	EFB is not convenient
b.	"Everybody prefers to use a private vehicle, if they have one. Private transport is faster. No need to wait, things that you need to do when you ride a bus." (*Anyar*, Man, JHS).	EnFB is more convenient

Source: FGDs from Fieldwork (2016).

Numerous negative attitudes were revealed during FGDs, which to some extent influence people's belief concerning their behaviour towards the environment and hinder them from practising environmentally friendly behaviour (EFB). Not all attitudes were expressed by each and every participant, rather different attitudes are inferred by different groups of people and they provide a fair cross-section of the attitude of community members about their behaviour towards the environment. Table 8.3 provides a synthesis of those attitudes which were implied by respondents during the focus group discussions.

Stoknes (2015, p. 31) states that imitating an action around us is part of human nature; and often "most [people] will imitate the majority even when our own eyes tell us that those in the majority are all blatantly wrong". Such attitude was also implied during FGDs in our case study. Quote 1a in Table 8.3 indicates how environmentally non-friendly behaviour (EnFB) could be very contagious; as such it was very easy for people copying the previously existing EnFB especially if the neighbourhood where such activities occurred just let such the behaviour happen. This finding supports Cialdini (2003) who discovered that people dropped more garbage in an area where lots of garbage already existed.

The above situation indicates people's failure to recognise adverse consequences of the bulk of litter on others living close to the disposal or to the environment in general. This attitude opposes an important dimension of attitude within the New Environmental Paradigm (NEP) introduced by Dunlap et al. (2000), i.e. the notion "potentially of eco-crises". As noted in Chapter 3, Dunlap et al. (2000) refer to this notion as a degree of awareness to a potential catastrophe impacted by environmental changes. Furthermore, the attitude implied by quote 1a also contradicts the altruism belief (Schwartz, 1977) which is an attitude that values other people's interest and the adverse consequences of a behaviour to the future generation; as well as believes in personal responsibilities to avert those consequences which refers to an attribution of self-responsibility. Altruism is an important driver for environmental conservation and it contradicts egoistic attitudes (Schwartz, 1977; Stern et al., 1999).

A lack of altruism is also depicted in quote 2 (a,b,c) and 3 (a,b), which imply a lack of attribution of self-responsibility to environmental behaviour.

Quote 2a in Table 8.2, illustrates a condition, where a respondent thought that separating waste at home was not his duty as scavengers will come in his neighbourhood and do that for him. Likewise, quote 2b recorded how a respondent often complained about non-friendly activities conducted by other people in the surrounding communities, however the respondent assumes that EFB is an individual's private matter. As such, people have no authority to confront others' EnFB.

Furthermore, the FGDs also reveal how several respondents perceived that ensuring everyone fosters EFB is the job of the community leader or the community organisation. According to these respondents, since EFB is a private matter, other people cannot interfere if another person is conducting an EnFB. They consider the authority has the responsibility to reprimand or prohibit such an action (see quote 2c in Table 8.3). Accordingly, the finding above is in line with Aprilia et al. (2012), who noted that almost half of the respondents in Jakarta strongly agree that government and waste providers should be fully responsible for managing waste services.

Other quotes state that respondents also consider the existence of differential environmental responsibility among everyone, in this case between genders. Quotes 2a and 2b state that environmental behaviour related to electricity saving and private transport maintenance are the responsibility of men. The existence of different job distribution within the population with regard to environmental preservation is also noted in previous studies. For example a study by Yoada, Chirawurah, and Adongo (2014) found out that in Ghana, it is generally perceived that transporting residential waste to the dumping sites is not the responsibility of everyone, it should be done by children.

In addition, Table 8.3 also indicates the presence of egoistic attitudes among the respondents, as implied in quote 4 (a,b,c,d), quote 5 (a,b,c) and quote 6 (a.b) (see Table 8.3). As egoistic attitudes only consider an adverse consequence for the self (Stern et al., 1993), these attitudes oppose the altruistic attitudes. Thus, egoistic is a negative attitude and could hamper people from acting in ways that support the EFB (Stern et al., 1999) .

Quote 4 (a,b,c) in Table 8.3 indicate how some respondents often assume that EFB is complicated and burdensome, as such EFB is uncomfortable. In contrast, EnFB is perceived as activities that are more practical and efficient. Quote 4a explains how a respondent considered it was impractical to travel on public transport, whereas quote

4b describes that building a toilet[84] over the river is more practical for some people because the water will take care of the dirt problem. In other words, building a toilet over the river will not require people to build an attached septic-tank or water facilities which the environmentally friendlier toilet will need. Furthermore, people do not only pollute the rivers by building toilets over the rivers, they also pollute the rivers with their trash (see quote 4c). Another respondent mentioned that for some people washing clothes in the river is more comfortable and practical than at home (see quote 3d).

Studies by Lorenzoni, Nicholson-Cole, and Whitmarsh (2007) and Lindén, Carlsson-Kanyama, and Eriksson (2006) are in line with the above findings. Lorenzoni et al. (2007) found out that some people in Norwich (UK) consider adjusting their lifestyle to combat climate change is inconvenient. Another study by Lindén et al. (2006, p. 1925) discovered that young households in Sweden perceived doing EFB such as energy-saving energy by lowering the heating facilities while away during daytime as "too troublesome".

Quote 5 (a,b,c) in Table 8.3 show that some respondents assume that EFB is useless or not as urgent as other activities, whereas EnFB is just an insignificant matter. Quote 5a illustrates how a respondent considered that there are a lot of other important things to do instead of planting a tree in their residential yard, whereas quote 5b describes how a respondent assumes that the way she treats her household garbage by burning would not affect anyone because her daily residential waste is only a little. During an FGD in *Bumijaya*, one respondent explained that burning the garbage is a standard way to solve the problem of residential waste. People in this village have bigger yards, compared with people in the other four FGDs locations. As *Bumijaya* does not have official landfill facilities nor official garbage collection services, people throw their garbage in a hole in their backyard. Once the hole is full, the trash is burned or buried. Furthermore, quote 5c described how a respondent perceives providing separate bins for organic and inorganic waste as "useless" because all residential waste in his area was "discarded" in one open dump with no separation between organic and inorganic. As such when his residential waste was put out in the public waste collection, the waste would be remixed.

[84] Figure 2.21 in Chapter 2 illustrates an example of toilets over the river in South Sumatra.

Accordingly, the finding mentioned earlier is in line with a study by Lorenzoni et al. (2007) who found that in Southern England, some people still consider that green house gases (GHG) resulting from riding private cars are not that big. However, a finding of this study contradicts De Feo and De Gisi (2010), who found that more than 86% of their respondents in Southern Italy declared that separating residential waste at source is useful. It should be noted that the characteristics of respondents from the latter study are quite different from ours. De Feo and De Gisi (2010) conducted their research in the city of Mercanto San Severino where the participants had a door-to-door garbage collection service.

Next, quote 6 (a,b,c) in Table 8.3 emphasises the importance of convenience to motivate people to adopt an EFB. According to a male respondent in *20-Ilir*, a person will tend to do an activity that is comfortable to them, regardless of whether the action is EFB or EnFB. During the focus groups there were several inconveniences experienced by respondents on EFB indicators, which then hinder these people from adopting such behaviour. In the area of transportation, a respondent considers that public transportation, such as buses; often force the passengers to wait until the bus is full, which can be unpredictable with regard to timing. In contrast, riding private vehicles, especially motorbikes, is more comfortable than the current public transport, such as buses or urban/rural transport. Using motorbikes can save time from waiting for the bus to arrive or from the bus pulling over to wait for other passengers. In addition motorbikes are seen as more straightforward practical and efficient. People can avoid traffic jams better with motorbikes than public transport and furthermore motorcycles are more suitable than cars in adapting to the crowded spaces, or narrow roads in alleys.

A previous study has also detected similar situations. A study by Ewing (2001) found less convenient methods of recycling would meet much less support, and suggested that as the perception of inconvenience has a negative influence on participation in kerbside recycling, it is deemed as a negative attitude towards EFB. The negative attributes related to this are the time and effort involved in separating recyclables from regular garbage and, in some cases, cleaning the items.

8.4.2 **Subjective norms towards environmental behaviour**

The Theory of Planned Behaviour (TPB) suggested that investigating subjective norms is important in any study related to environmental behaviour (Ajzen, 1991) because an individual's positivity of feeling towards environmental behaviour is affected by how those of importance to this individual think of the behaviour. FGDs also suggested several shreds of evidence indicating the "important others" for respondents in our case study. Table 8.4. presents a synthesis of the subjective norms implied by the participants during our studies.

Table 8.4. Respondents' norms towards EFB .

No.	Quote	Key message
1.	"For me, I always hear what my parents, my father or mother at said at home. Because everything said by my parents is always true. It is definitely for the good. While the other people except parents, often they have interests." (*20-Ilir*, Man, University).	Parent have a strong influence
2.a. b.	"Nowadays, no one forbids it. Besides, our garbage is not much. Only one plastic bag. It immediately drifts in the water. Nobody will smell it."(*Anyar*, Woman, JHS). Yes no one forbids people searching for firewood." (*Anyar*, Woman, Finished Year 9).	Society approves

Source: FGDs from Fieldwork (2016).

In general, the FGDs have determined that 'my parents and my society' are the relevant important others for the respondents in our study. Hence, the sense of favourableness or unfavourableness towards environmental behaviour by parents and society highly influences people's decisions in actively practicing environmental behaviour.

Quote 1 in Table 8.4 indicates that respondents consider family an essential institution that could influence their decision to engage or not engage in EFB. According to this quote, since his parents have never put any interest other than that for the sake of good of their children, then any recommendation from his parent should be respected.

Other respondents indicate that it does matter whether or not the society accepts environmental behaviour. According to some people several EnFBs are common and socially acceptable, as no one has ever banned people from adopting these EnFBs. In quote 3a Table 8.4, a respondent mentioned that dumping waste in the river is accepted in her community, and no one forbids it. This respondent lives in *Anyar* village, located upstream on the Komering River where water flows profusely, consequently when people throw trash into this river, it will flow away.

The above findings support Palmer, Suggate, Bajd, and Tsaliki (1998) who found that close family's opinions, including those of parents and grandparents, matter in awakening and fostering respondents' interest and engagement in reading about environmental issues. Furthermore, another study by Ewing (2001) suggests that efforts to engage in an EFB, e.g. recycling, are influenced by people's beliefs whether or not their household members, friends, and neighbours expected them to participate in the behaviour.

8.4.3 **Perceived behavioural control (PBC) towards environmental behaviour**

Besides attitudes and subjective norms (SN), another variable which could influence people's intention in adopting a behaviour is perceived behavioural control (PBC) towards EFB. PBC will impact on the extent to which individuals perceive the behaviour is within their control or not. Evidence suggested that respondents perceive that environmental behaviour is to some extent hard to accomplish which reflects the extent of barriers experienced by respondents in their daily life. This thesis grouped these barriers into four areas, namely, (i) economic constraints, (ii) a lack of public facilities, (iii) a lack of knowledge and awareness, and (iv) weak enforcement of environmental requirements.

8.4.3.1 ***Economic Constraints***

First, many respondents in the focus groups mentioned that 'high cost' of adoping EFB poses a challenge for them. In *Bumijaya* for example, households without private toilets is still common, therefore many people rely on public toilets or use their neighbours' toilets. In quote 1a, Table 8.5 a participant in *Bumijaya* stated that having their own toilet is extremely important and she wanted private toilet facilities at home. However, her household does not have enough finance to build the septic-tank attached to the toilet. In *20-Ilir*, respondents mentioned economic factors had prevented them from using public transports facilities. In quote 1b Table 8.5, a participant explained he chooses to use private transport rather than public transport because by comparing the price of the two modes of transportation, he came to the conclusion that driving his motorbike (i.e., private transport) was cheaper.

Table 8.5. Economic constraints hindering respondents in applying EFB.

No.	Quote	Key message	Implied barrier
1.a.	"It's expensive. I have no capability to build my own toilet. If I have money, I want to build a toilet first." (*Bumijaya*, Woman, JHS).	Expensive	Economic constraint
b.	"If I take public city transport, every time I move out from one public vehicle to the other, I must pay again. So if I have to ride two vehicles, it'll cost me double." (*20-Ilir*, Woman, University).	Need more money	
2.	"Don't talk about paying the dues, [fulfilling necessities] to eat is difficult." (*Pagarnegara*, Man, SHS).	Lack of money	Economic constraint

Source: FGDs from Fieldwork (2016).

Furthermore, FGDs reveals that poverty can also hinder people from being environmentally friendly (see quote 1c). Participants in a *Pagarnegara* focus group explained that most people in their region are poor. Poverty hinders people from paying the garbage collection fee on schedule, which in turn causes a delay of garbage collection in their area, resulting in household trash to continue to accumulate. During the fieldwork in Lahat Regency, the author of this thesis noticed that a garbage collection service from temporary landfills is available in some places, however the public is required to pay a specific contribution for this. This fee is not collected through the village head, rather the households using the service have to pay the fee directly to the garbage collector. Figure 8.5 provides an example of door-to-door garbage collection service in Lahat Regency. In the picture we could also see several garbage sacks hung against the house fences which indicates how households in Lahat City prepare their residential garbage prior to collection by a waste collector.

Figure 8.5. An example of door-to-door garbage collection service in Lahat City when the service is available.

Source: Google (2015a)

The above findings indicate that price is a matter in EFB and some respondents appear to assume that EFB will have a significant negative impact on their household economy. This is evidenced when many people quote ‘expensive’ as a barrier that hinders them from using public transport, or using low carbon fuel for transport , cooking or lighting.

8.4.3.2 ***Lack of public facilities***

Table 8.6. A Lack of public facilities that hinders respondents in applying EFB.

No.	Quote	Key message
1. 2.	“There is no public transportation entering our village. We live on a cliff." (*Pagarnegara*, Man, SHS). "Sometimes I have to wait for hours. *Angkot* is still rare." (*Bumijaya*, Woman, JHS).	EFB is inaccessible EFB is wasting the time
3.a. b.	“The arrival of public transport is unpredictable. Sometimes it can take a long time. It’s not necessarily there when we need it." (*Kayuara*, Woman, SHS). "Because of their route, Ms. They only serve a certain route. For example, if I want to go to the market, I cannot ride TransMuba, because there is no route to go there. In addition, now the Trans MUBA is only focused on transporting schoolchildren. The time of departure is only when the child goes to school and when the child comes home from school." (*Kayuara*, Man, SHS).	EFB is time wasting EFB has lack in services
4.a. b. c.	“There is no official temporary dump in the village. People throw garbage in their homes.” (*Pagarnegara*, Man, SHS “The garbage is often just piled up [in the dumping site]. There was no officer picking it up, so the garbage was decomposed. Our environment was disturbed." (*Pagarnegara*, Man, SHS). “Well, we have no official temporary garbage disposal facility. We do not have facilitate with officers who take the trash from house to house, or from the unofficial temporary garbage can, either." (*Pagarnegara*, Man, SHS).	EFB is inaccessible EFB has lack in services EFB has lack in services
5.a. b. c.	“The government has not yet provided a public trash can. The garbage bins in the garden are not really the official waste bins built by the government." (*Anyar*, Man, JHS). "The choice is only two, throwing it into the garden or to the river. For people living near the river, throwing the garbage into the garden is far away. Sometimes, if the owner of the garden sees, he/she will scold people who throw garbage in his/her garden." (*Anyar*, Man, JHS). “[the garbage leaves are] too much. The garbage box can be filled quickly. [The house is also] narrow. Garbage leaves accumulate quickly." (*Kayuara*, Woman, SHS).	No public facilities No public facilities Official bins are limited
6.a. b.	"There are not many gas sellers. There is only one gas seller near our house. When, the gas at the stall near the house runs out, we should buy the gas in *Talang Jawa* or *Pagun*[85]. Sometimes, we already go to buy the gas in these areas, but the gas also runs out there." (*Pagarnegara*, Woman, SHS). "We need to spend transportation cost also to buy gas. So, we do not only need to pay the price of gas, but also the cost of transporting the gas tube.” (*Pagarnegara*, Woman, SHS).	Cooking gas store is far away
7.a. b.	"We must go to the gas station. Buying fuel in the gas station is less comfortable. It is far. The queue is also long."(*Pagarnegara*, Woman, SHS). “Besides being expensive, Pertamax is only available at the kiosk [fuel station], it is not sold by retail sellers. Here we only have one kiosk, the queue in there is long. We prefer to buy at retail gasoline shop. If the gasoline at the retails runs out, we then buy gasoline at the kiosk." (*Anyar*, Woman, JHS).	EFB is less comfortable Less accessible
8.	"Some people still defecate in the river. There’re toilets are there." (*Anyar*, Woman, JHS).	No facilities for EFB
9.	"Riding public city transport is also risky for mugging. Sometimes there are thieves on public city transports." (*20-Ilir*, Woman, University).	Lack of security in doing EFB

Source: FGDs from Fieldwork (2016).

[85] *Talang Jawa* and *Pagun* are wards in Lahat Regency.

Focus group participants also mentioned a lack of public facilities as constraints to EFB. In quote 1, Table 8.6, a respondent in *Pagarnegara* mentioned that there was no public transport going through his village. Since their town is on a cliff, they need to walk an extra distance to go up and down the hill, to get into the city centre, for shopping, bringing their children to school, working, etc. The trail is quite tiring. The absence of public transport forces almost all citizens in the region to buy private vehicles.

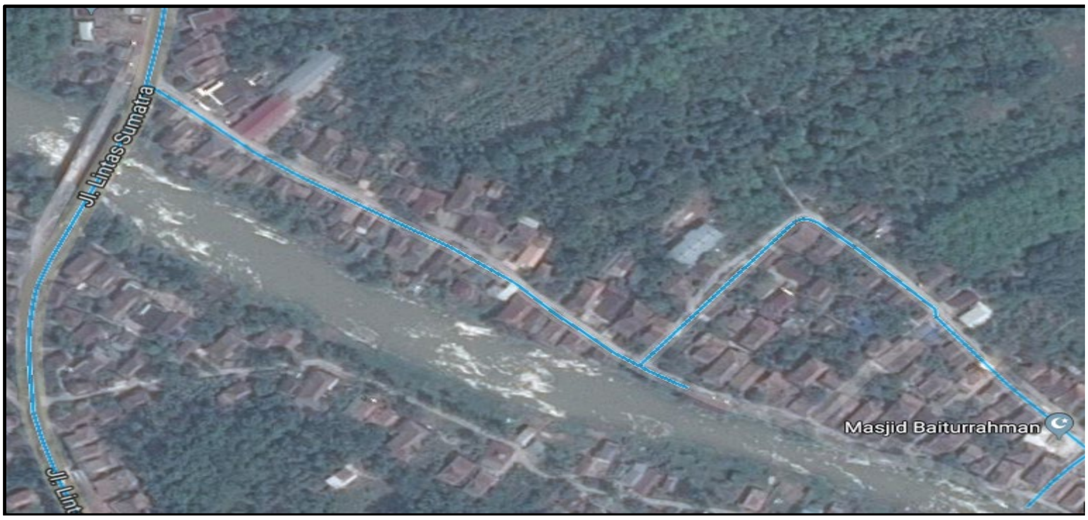
A similar experience has occurred in OKUS. In contrast to *Pagarnegara*, *Bumijaya* is flat but the distance from *Bumijaya* to the City Centre, where most of the public facilities are located, is farther than in *Pagarnegara*. During FGDs, participants mentioned that it is almost impossible for them to go on foot to the City Centre for shopping and other errands. Village transport facilities do exist to link their village with Muara Dua, the capital of OKUS, but the village transport is built not just for the villagers of *Bumijaya, it* is also meant for residents of all the towns alongside *Muara Dua* road. As such, the transport takes a long route and needs hours to complete one route, while the number of vehicles in the fleet is also inadequate. Furthermore, the timing of public transport across the village can never be predicted. In quote 2 Table 8.6, a respondent said that she often needs to wait for hours for public transport to come. Such problems prevent people from relying only on public transport facilities for travelling.

Unpredictable timing of public transport was also noticed in *Kayuara*. According to some respondents, public transport in *Kayuara* is limited to certain roads (see quote 3a in Table 8.6). As a result, as quote 3b states, people prefer to travel around in their private transport. Generally, the MUBA government has already provided its residents with public transport facilities, i.e., TransMuba, however as noted in quote 3b Table 8.6, TransMuba operates on limited established routes in several specific areas. This participant also stated that the transport operates at limited times, such as at times when the children go to school and come home from school.

Lack of facilities also hinders people from adopting EFB in the area of waste management. In *Pagarnegara* Village, the problem of waste has become a significant issue as discussed by the people during FGDs. Quote 4a and 4b mentioned how the government does not facilitate them with temporary dumping facilities or garbage collection. Currently, people solve their garbage problems by throwing the trash into open dumps which are not official temporary landfills (see Figure 4.23 in Chapter 4), or in their garbage bins at home. Furthermore, quote 4c and 4d mentioned that the problem of waste in *Pagarnegara* is not merely about the presence or absence of official garbage dumping: it is more related to there being no definite schedule of official garbage collections, which could transport the garbage in the open dumps to the final landfill.

The absence of official garbage dumps and transportation is also mentioned in *Anyar* Village. The difference is, while in *Pagarnegara* Village people overcome the problem of waste by burning it, in *Anyar*, the communities overcome garbage problems by throwing their garbage into the river (see quote 5b). Both of these areas, *Pagarnegara* and *Anyar*, have rivers crossing their village, however since *Anyar* is located upstream, its river is larger and swifter, while the river in *Pagarnegara* is smaller and shallower. Consequently, the waste thrown by the people of *Pagarnegara* into the river is not carried away by the water flow. During the FGDs, respondents in *Pagarnegara* showed their dislike over the activities of throwing the garbage into the river. Conversely in *Anyar*, throwing waste into the river is an action that tends to be accepted by the surrounding community. Figure 8.6 and Figure 8.2 mentioned before provide views of the two rivers.

Figure 8.6. A view of Komering River that crosses *Anyar* Village.



Source: Google (2015c).

Lack of access to landfill and garbage collection was also mentioned in *20-Ilir*, *Kayuara*, and *Bumijaya*. However, each region has a different set of issues and, thus, the population comes out with different solutions. As in *Pagarnegara*, *Bumijaya* has no official temporary dump (*tempat penimbunan sementara* or TPS) or garbage transport, however *Bumijaya*'s population is not as desnely setteled as *Pagarnegara*'s. Furthermore, the distance between residential houses in *Bumijaya* is not as close as that in *Pagarnegara.* On average, residents in *Bumijaya* possess a large yard, so they possibly throw their residential garbage in their yards.

Further, although *20-Ilir* does have its own TPS, however it does not have door-to-door garbage collection . Residents overcome their waste problems by disposing of their garbage in a TPS located in a traditional market close to their residence (see Figure 4.23 in Chapter 4). In *Kayuara*, residents mentioned that the local government has assisted people by placing garbage bins in public places. However, the bins are small, hence they cannot accommodate everyone's daily garbage (see Figure 8.7). Furthermore, these bins are mostly located near the road; hence they are only accessible to certain people.

Figure 8.7. Official garbage bins in Sekayu, MUBA.

Source: Google (2015e).

Lack of facilities also hinders people from using a more friendly cooking fuel, such as gas. Some respondents said the gas supply at local retailers is not enough and their stocks are easily depleted (quote 6a Table 8.6). Other respondents mentioned that the location of the retail gas store was far away and people need to spend extra money on transport to get into the store (quote 6b Table 8.6). In contrast, firewood sellers serve people door-to-door. During our fieldwork in *Pagarnegara*, we noticed that several houses have firewood storage (see Figure 8.8).

Figure 8.8. A house that has firewood storage in *Pagarnegara*.

Source: Google (2015b)

Furthermore, lack of facilities also means people use low carbon fuel for their private motor vehicles such as Pertamax or Pertalite. Some respondents stated that Pertamax is rarely sold in retail stores (quote 7b Table 8.6) and that going to the official fuel stations is sometimes less comfortable, because of the location and also the very limited availability of official fuel stations in regencies/city (quote 7a Table 8.6).

It has been seen earlier that many respondents live in houses that do not have a private toilet. Although the village may have some public toilets, many respondents in *Anyar* Village for example, still defecate in the river (see quote 8 Table 8.6). During the fieldwork, we noticed that the number of public toilets in *Anyar* was limited and most of them were ill -maintained and dirty. Furthermore, the public toilets were located far from the river areas, consequently residents living by the rivers still choose to defecate in toilets overhanging the river.

Lack of security, which triggers criminality, is also mentioned as a barrier that hinders the adoption of EFB. In *20-Ilir* for example, a mother was worried about the rampant crime on public transport (see quote 9 Table 8.6), causing her to feel more comfortable using a private vehicle.

8.4.3.3 ***Lack of knowledge and awareness***

Some respondents considered that a lack of knowledge also hinders people from adopting EFB. A lack of knowledge was evident in *Kayuara* when a respondent mentioned that he had never heard about an indicator of environmental behaviour being researched (quote 1 in Table 8.7). A lack of knowledge in environmental behaviour also causes wrong practice. In *Bumijaya*, several respondents confidently explained that the right 'septic-tank' is the one that is not fully-plastered (see quote 2 a, b, c). They stated that cement for plastering the hole for the septic-tank should only cover the walls, but not the base. They suggested that avoiding plastering the base meant that the septic-tank would not get full so easily.

Table 8.7. Lack of knowledge and awareness that hinders respondents in applying EFB.

No.	Quote	Key message
1.	"What is emissions test? I do not understand there is such a thing. I do not think I've ever done it." (*Kayuara*, Man, SHS).	No knowledge
2.a.	"All the wall is in cement, but not the floor. The water will not be absorbed if the floor is plastered with cement. In addition, the wall should not be plastered, just put the bricks together." (*Bumijaya*, Man, JHS).	Wrong practice
b.	"The water is not absorbed if the walls are plastered. Here it is not like in the city. Toilets are not needed to be sucked in here." (*Bumijaya*, Man, JHS).	Wrong practice
c.	"It will never be full, Ms. The dirt is absorbed by the ground." (*Bumijaya*, Man, JHS).	Wrong practice
3.a.	"We look for firewood in the woods. Our hamlet still has a lot of wood. It is easy to find firewood." (*Bumijaya*, Female, JHS).	Lack of awareness
b.	"No need to save water. Our tap water runs for 24 hours. Rain water is also a lot. River water is also flowing. Our water supplies are abundant." (*Kayuara*, Male, SHS).	Lack of awareness
c.	"Yeah, our river has heavy water. The garbage will be carried away." (*Anyar*, Female, JHS).	Lack of awareness

Source: FGDs from Fieldwork (2016).

This study also reveals that abundant resource availability and their easy accessibility could provoke EnFB. Quote 3 (a,b,c) illustrate how some focus group respondents consider that the availability of natural stocks in their area is currently plentiful, e.g. abundance of firewood in *Bumijaya*, or abundant fresh water or a river with adequate currents in *Anyar* and *Kayuara* villages; as such, they consider that their EnFB to the environment is just something small and will not have a significant impact on the environment.

8.4.3.4 ***Weak law enforcement***

The issue of law enforcement also came out during the focus groups as mentioned in Table 8.8. According to a respondent in *Kayuara*, authorities in his area merely put out a bulletin board about the ban on littering (see quote 1). Similar conditions are also mentioned by respondents in *Pagarnegara* and *20-Ilir* (see quote 2,3,4). While quote 2 complained about the ban that has never been followed by legal sanctions if the prohibition is violated; quotes 3 and 4 were complaining that there have never been strict sanctions taken to ensure the regulations are enforced.

Table 8.8. Weak law enforcement that hinders respondents from applying EFB.

No.	Quote	Key message
1.	"The notice is only through banners or boards of appeal. The notice said, "don't litter to the river, or it is forbidden to throw garbage carelessly. But, there has never been any sanction." (*Kayuara*, Man, SHS)	Weak law enforcement
2.	"The government just lets it happen. If the government is tough, the people will automatically obey it. Try to apply sanctions, for anyone who throws garbage into the river, they'll be fined". (*Pagarnegara*, Man, SHS).	Weak law enforcement
3.	"The government just gives recommendations, [asks people] not to throw garbage carelessly. But there are no sanctions. For example, if there are people still doing it, they should be sent to the prison, or what ."(*20-Ilir*, Man, University).	Weak law enforcement
4.	"There was once [law enforcement]. This person said, 'do not throw garbage carelessly'. But it's just a lecture. When anyone does [throw garbage carelessly], nobody said anything." (*Kayuara*, Woman, SHS).	Weak law enforcement

Source: FGDs from Fieldwork (2016).

Figure 8.9. Garbage just under a no dumping allowed notice in Palembang South Sumatra.

Source: Kurniawan (2018)

Chapter 3 identified a list of laws introduced at the national level supporting the adoption of EFB, i.e. concerning pollution control (Undang-Undang - UU No.32, 2009), waste management (UU No.18, 2008), water conservation (UU No.26, 2007) and energy-saving (Peraturan Pemerintah - PP No.15, 2005). However, many people on the ground are unaware of the consequence if people keep ignoring these laws. Figure 8.9 shows a situation, where the government put up a notice board, which encourages people not to litter in that area, however a large amount of litter has been left on the ground near the notice which shows it has been ignored.

8.5 **Conclusion**

This chapter has discussed the perception of the people about environmentally friendly behaviour according to the results of the household survey and the focus group discussions and identified the attitudes to subjective norms and perceived behavioural control implied by the respondents. A summary of the perception of environmentally friendly behaviour – EFB as well as attitude, norms and barriers that hinder the environmental behaviour and their key messages is provided in Table 8.9.

Table 8.9. Summary findings from qualitative study.

No.	Perception of EFB and attitude, norms and barriers that hinder EFB	Key messages
1.	Perception:	environmental behaviour is mostly related to waste management
2.	Attitudes towards environmental behaviour	Lack of altruism, egoistic attitudes
3.	Subjective norms towards environmental behaviour	What my parent says matters, society approves environmentally not-friendly behaviour – EnFB
4.	Barriers towards EB	Economic constraints, lack of public facilities, lack of knowledge and awareness, weak law enforcement

Source: FGDs from Fieldwork (2016).

This chapter reveals the overwhelming existence of participants in both the household surveys and the focus groups who link environmental behaviour mainly with garbage management. This shows that the participants of this study are aware of the negative impact of littering on the environment, however the way people frame the concept of environmental behaviour only in the area of waste issues also indicates that the majority of study participants are still not fully aware of the other dimensions of environmental behaviour, such as energy and water conservation or food, housing and transport-friendly behaviour. Furthermore, the awareness of garbage issues was also mostly limited to discussion around littering. Other aspects of garbage issues, such as recycling, reducing and re-using, have not yet become familiar to most of the participants of this study.

In addition, the findings of FGDs also show that the respondents often relate environmental behaviour to the environmental problems that they have been experiencing. This study noted that a definition of environmental behaviour by relating it to transport-friendly behaviour, such as reducing the use of private transport, only occurred in the group discussion in *20-Ilir*. In this area, people have encountered travel congestion problems and then air pollution. In another case, the awareness of reforestation for environmental conservation was only mentioned by respondents in *Pagarnegara* who have been witnessing the process of deforestation.

With regard to people's attitude, this study uncovered the existence of egoistic values followed by a lack of altruism, which negatively affects the intention to adopt EFB. Furthermore, while investigating the subjective norms, this research found that a consideration of what family and society might think critically influences environmental behaviour. In addition, the presence of several barriers have hindered the adoption of EFB, for example economic constraints, a lack of public facilities, a lack of knowledge and awareness, and weak enforcement of environmental law all have an impact.

Four constraints that are important in influencing the respondents against adopting EFB have been identified in this chapter: (1) a lack of knowledge and awareness, (2) a lack of public facilities/incentives, (3) the presence of an egoistic attitude that avoids self-responsibility. However, this study also perceived a possible driver that could highly influence the adoption of EFB in the future, i.e. (4) the perceived norms.

First, a lack of knowledge and awareness is indicated on the perception that environmental behaviour is mostly related to waste management, the attitude of easily copying the previously existing EnFB and the belief that EFB is beyond individual responsibilities. Second, the presence of a lack of government initiatives is indicated by the presence of economic constraints, lack of public infrastructure and weak law enforcement as barriers that hinder people from adopting EFB. Third, the lack of an altruistic attitude is indicated by the presence of an egoistic attitude, a belief of no consequences and lack of personal responsibilities. Finally, the potential perceived norms as possible influencers on people to actively participate in environmental behaviour was seen during the discussion on subjective norms. The relationships between the drivers and the summary of finding from the FGDs is provided in Table 8.10.

Table 8.10. Perception of EFB and attitude, norms and barriers that hinder EFB and their possible drivers.

No.	Perception of EFB and attitude, norms and barriers that hinder EFB	Possible drivers
1.	Perception: environmental behaviour is mostly related to waste management	Lack of awareness (i)
2.	Attitudes towards environmental behaviour	
a.	Imitating EnFB	• Lack of awareness (i) • A belief of no consequences (3)
b.	EFB is beyond my responsibilities	Lack of awareness (i)
c.	Some jobs are for men	
d.	EFB is complex, not practiced, not efficient nor comfortable	Egoistic attitude (3)
e.	EFB is unnecessary activities or not as urgent as other activities, whereas EnFB is just a tiny insignificant matter.	Egoistic attitude (3)
f.	EFB is inconvenient, while EnFB is more convenient	Egoistic attitude (3)
3.	Subjective norms towards environmental behaviour	
a.	What my parent says matter	Perceived norms (4)
b.	Society approves	Perceived norms (4)
4.	Barriers towards environmental behaviour	
a.	Economic constraints	Lack of government incentives (2) / Egoistic attitude (3)
b.	Lack of public facilities	Lack of government incentives (2)
c.	Lack of knowledge and awareness	Lack of knowledge and awareness (1)
d.	Weak law enforcement	Lack of law enforcement and monitoring (2)

Source: FGDs from Fieldwork (2016).

To improve the level of environmental behaviour in South Sumatra, several changes need to be made. An effective policy program to encourage the adoption of EFB needs to be identified by targeting the relevant constraints in that particular context. Furthermore, since a single intervention often influences only some of these barriers, multiple interventions are needed (Wilson & Dowlatabadi, 2007). Such policies can include programs to increase people's awareness of environmental behaviour and to ensure that the government provides adequate public facilities and other incentives to enable people to adopt EFB. Such policies should also be followed by law enforcement and monitoring.

CHAPTER: 9 CONCLUSION

9.1 A brief summary of the study

The effects of human activities on the global environment have been significantly adverse and will continue to worsen in the future. The Intergovernmental Panel on Climate Change — IPCC (2014b) provides corroborative evidence that environmentally unfriendly behaviour by humans has significantly contributed to the creation of greenhouse gases in the atmosphere leading to global warming and climate change. The damage caused by climate change calamities is undeniable. It endangers the entire planet and is likely to be more severe than previously thought. People need to start rethinking their lifestyle and reducing their consumption and waste to help conserve the environment. In other words, everyone should engage more and more in an environmentally friendly manner. However, there are very few studies aimed at systematically measuring people's environmental behaviour in general and Indonesia in particular.

This thesis has added a deeper insight into the measurement and understanding of environmental behaviour in the Indonesian context by taking a case study of South Sumatra Province. As stated in Chapter 1, this thesis seeks to investigate:

1. What is the current level of environmental behaviour in South Sumatera and how friendly is it towards the environment?
2. What distinguishes the environmentally friendly people of South Sumatra from those who are environmentally not friendly?
3. Do people's socioeconomic characteristics (demographic and lifestyle characteristics) have a role in these differences?
4. Why do people behave with the environment in the way they do?

The current chapter presents a brief summary and conclusions of this thesis. It is organised into four sections, including the present one. The first section is introductory in nature. The second section provides the summary of the research findings; the third section contains a discussion of the implications of this research for further research and the fourth section provides recommendations for policies for strengthening Environmentally Friendly Behaviour — EFB in the case study region.

9.2 Summary of findings

Chapter 2 reviews the relevant literature in the area of population and environment and highlights the knowledge gap that needs clarification. According to this chapter, previous research has shown a collective agreement that the adoption of an environmentally friendly behaviour (EFB) in daily life is essential for the conservation of the environment. However, different researchers approach environmental behaviour from different definitions and measures. Nonetheless, monitoring of people's environmental behaviour across time and region requires an indicator that is comparable and reliable, which unfortunately was not yet available in Indonesia, let alone in South Sumatra, up to 2016 when the present study was initiated.

In an attempt to fill the above research gap and to address the questions stated above and outlined in Chapter 1, this study focusses on six objectives:

1. To gather information about people's environmental behaviour with respect to key consumption items and waste disposal to support their lifestyle in South Sumatra.
2. To gather information about the demographic and lifestyle characteristics of the representatives of the selected sample of households surveyed in South Sumatra.
3. To develop an environmental behaviour index — EBI, a composite measure that can be used to monitor people's environmental behaviour at the micro, meso and macro level in South Sumatra. Micro-level refers to the individual (unit of analysis) level, the meso-level refers to the level of each dimension of environmental behaviour and the macro-level refers to the provincial level.
4. To introduce an approach to distinguish the environmentally friendly and the not-friendly group.
5. To examine the relationship of EBI with demographic and lifestyle factors in South Sumatra, and
6. To understand the reasons behind the adoption or the non-adoption of environmentally friendly behaviour (EFB) in South Sumatra

To achieve these objectives, this study collected information from both primary and secondary sources. Chapter 3 provides a detailed research design from the process of sampling to data collection. In addition, this chapter also discusses the strategy adopted during fieldwork, the process of data recording and data analysis.

The findings of this study are based on an analysis of information gathered through available secondary data and primary data, collected in South Sumatra from August to October 2016. Both quantitative and qualitative data were collected for this study. The quantitative data were collected from primary and secondary sources, whereas qualitative data were gathered from primary sources through focus group discussions. The primary source is a fieldwork conducted by the author from a sample of 466 households in four regencies and the capital city, Palembang after interviewing the heads of the selected households based on a questionnaire. The secondary data sources include Statistics Indonesia — *Badan Pusat Statistik* (BPS), The Ministry of Environment and Forestry (*Kementrian Lingkungan Hidup dan Kehutanan* — KLH), Bappeda — The Regional Development Planning Board of South Sumatra and other agencies.

The objectives are fulfilled in the heart of the thesis comprising five chapters, from Chapters 4 through 8. These chapters provide findings of the analyses of quantitative and qualitative data as the answers to the research questions identified above.

9.2.1 **What is the level of environmental behaviour in South Sumatra and how friendly is it towards the environment?**

Chapter 4, 5 and Chapter 6 provided answer this question by examining the secondary data and the primary data from household data collection.

Chapter 4 provides a picture of the population issues in South Sumatra that poses a threat to the environment in the province. Furthermore, the state of the environment suggests that to some extent, people's daily behaviour has contributed to environmental degradation.

Chapter 5 also discusses how the household survey took place in five selected regencies/city sites of South Sumatra, namely the regencies of Lahat, Ogan Komering Ilir (OKI), Ogan Komering Ulu Selatan (OKUS) and Musi Banyuasin (MUBA), captures the wide variation in South Sumatra in terms of demographic, administrative economic characteristics. Next, this chapter (Chapter 5) explains a thorough process of the procedure in creating the Environmental Behaviour Index (EBI) by factor analysis applied on the data.

The EBI introduced by this thesis in Chapter 5 is an indicator to measure the state of environmental behaviour in South Sumatra. This index is introduced to raise awareness and to provide an understanding of the state of environmental behaviour in an Indonesian context. In addition, this index would be beneficial to help compare the environmental behaviour among regions and across time. Analysing the trends in EBI could provide a picture of where and how the changes have been occurring, and to call attention to the areas in greatest need of additional resources in fostering environmental behaviour.

The index EBI has been so constructed that it takes the values from zero to 100: the higher the index the better the environmental behaviour. The thesis started out with people's environmental behaviour in six dimensions of daily living, comprising a total of 30 variables, which were reduced by factor analysis to five dimensions and 15 variables. These five dimensions comprising a total of 15 variables form the basis of the construction of EBI. These five dimensions are: (i) transportation friendly behaviour; (ii) behaviour related to water efficiency; (iii) food-friendly behaviour; (iv) littering-related activities; and (v) a hybrid dimension consisting of firewood and toilet friendly behaviour.

Chapter 5 also introduces the friendliness line. This line acts as a cut-off to distinguish EFB between environmentally friendly and environmentally not-friendly behaviour. This line is constructed by adopting the two-thirds methods previously introduced by Alkire and Foster (2011) to categorise human well-being.

Next, chapter 6 elaborates the EBI of South Sumatra at micro, meso and macro levels. At a micro or individual level, a person or a household is deemed to have an environmentally friendly behaviour (EFB) if the EBI of that person or the household is 66.67 or more (two-thirds or more) on a scale of 0 to 100. Only a small proportion (20.6%) of the respondents are found to be environmentally friendly at the micro level (see Figure 6.1, Chapter 6)).

Environmental behaviour at a meso level, i.e. at the level of dimensions is deemed to be friendly if the average EBI of the respondents in that dimension is 66.67 or more on a scale of 0 to 100. Only one dimension out of five dimensions has been found 'environmentally friendly' (see Figure 6.2 in Chapter 6). Whereas, the contribution of this environment-friendly dimension (littering) to the overall EBI is very small compared to the other four dimensions (see Figure 5.9 in Chapter 5).

The macro level environmental behaviour is measured by the average EBI score of all respondents in the province (South Sumatra). The mean EBI score of all respondents at the provincial (macro) level is 46.92, which is way below the friendliness line of 66.67, implying that the people of South Sumatra are, on average not friendly to the environment.

To sum up, the findings of Chapter 6 indicate that respondents in this study tend to behave in an unfriendly way towards the environment at all levels of the EBI; the micro (individual level), the meso (the dimension level) and the macro (overall level) levels. At the micro level, Chapter 6 reveals that the EBI ranges from 2.18 to 94.73; with a massive majority of the respondents holding EBI below the friendliness line. As mentioned earlier, further investigation at the meso level shows that respondents performed in a friendly way in only one out of five dimensions (namely littering), the contribution of which to the overall EBI is little compared to the other four dimensions (see Figure 6.2 Chapter 6 and Figure 5.9 in Chapter 5). This indicates that people were performing unfriendly behaviour in the majority of the factors considered in this study. Moreover, the findings also show that the people achieved the lowest level of EBI at the most dominant dimension, i.e. transport-friendly behaviour. This condition contributes the most to the low level of the EBI at the macro level, which is equal to an EBI of 46.92, still far below the friendliness line.

9.2.2 **What distinguishes the environmentally friendly people of South Sumatra from those who are environmentally not friendly?**

Chapter 7 showed that the state of EBIs across the demographic and lifestyle characteristics are varied. Thus, the chapter identifies the attributes in each group that performed EBI the least.

Unfortunately, based on the EBIs across socioeconomic characteristics and the friendliness line (EBI score equal to or more than 66.67) this thesis finds out that no demographic nor lifestyle characteristics is associated with EFB (see Table 7.11 and Table 7.12 in Chapter 7).

Concerning the EBI score, this study reveals within each demographic characteristic, groups that perform EBI the least were males, the rural people, OKI residents, higher educated people, higher household-sized people, younger people, the people engaged in agricultural work, and the migrants. In contrast, the groups scoring the highest in each category were females, urban dwellers, Lahat residents, lowest educated people, lower household-sized people, older people, those in non-agricultural employment and the non-migrants.

With regard to lifestyle, the characteristics that score EBI better were classified as the lowest per capita consumers of food/non-food/the combination of food and non-food, and the respondents that previously had tourism experience, engaged in non-smoking habit and had access to the internet.

Findings on the EBI performance are also in line with the headcount ratio. This study reveals that the group that performs EBI the highest in each category also tend to have the highest proportion of the environmentally friendly people. In contrast, groups that perform EBI the lowest in each category tend to have the highest percentage of environmentally unfriendly people.

9.2.3 **Why do people behave with the environment the way they do?**

Based on the results of the qualitative studies, Chapter 8 reveals that respondents are fully aware of the relationship of environmental behaviour with waste disposal activities; however, people are not yet aware of other environmental behaviour dimensions. Furthermore, awareness of the waste-disposal dimension is also only limited to the field of littering. Since respondents have limited understanding of the concept of environmental behaviour, it affects their lack of awareness on the issues which contributes to the low score of EBI in South Sumatra.

Chapter 8 further discusses the existence of several attitudes and norms that dominantly shape the environmental behaviour among the people. It also identifies the barriers that were hindering people from adopting EFB in their daily life.

Concerning attitudes, Chapter 8 provides a summary of six prevailing attitudes contributing to poor environmental behaviour observed in the study. These attitudes include a tendency to copy others' environment-unfriendly activities if such activities are socially accepted, a thought that “somebody else will do it” or, a belief that environmental protection (or environmental neglect) is merely an individual matter, therefore other people have no right “to reprimand others”. Furthermore, any other attitude being recorded during discussions include thinking or stereotyping that a specific EFB is related to a specific group of people. In addition, people also often consider that “EFB is inconvenient, complex, not practicable, nor efficient, nor comfortable”, or, “it is not urgent yet”, “useless”, or “not-friendly activity is a small matter, it will not give impact” to the environment.

In contrast, the dominant subjective norms which shape the environmental behaviour of the focus group respondents include a belief that what parents (father and mother) say matters and environmentally not friendly behaviour, to some extent, is socially acceptable.

Barriers that hinder respondents from performing EFB are found to include economic constraints, a lack of public facilities, a lack of knowledge and awareness and weak law enforcement.

Based on the findings related to attitude, subjective norms and perceived behavioural control, possible drivers of environmental behaviour are outlined in this study, i.e. a lack of knowledge and awareness, the lack of government initiative, a lack of altruism and the potential perceived norms as potential influencers to active participation in environmental behaviour.

9.3 **Contributions to knowledge in the thesis**

This study contributes to the field of population and environment with particular reference to the environmental behaviour literature. Firstly, it is concerned with the discussion of environmental behaviour issues in South Sumatra. The existing literature on environmental behaviour generally refers to developed countries and/or Western European countries. The focus of the present is the province of South Sumatra, Indonesia where issues of environmental behaviour are considered not important as yet.

Secondly, this research introduces a new indicator to measures the environmental behaviour as a multidimensional construct by considering eight well-recognised criteria and proposing the use of factor analysis with other measures such as parallel analysis (Franklin et al., 1995) to the development of an index. Parallel analysis enables researchers to have a high degree of confidence about the number of factors to extract prior to exploratory factor analysis. Common methods used in the literature to identify factors within exploratory factor analysis have been shown to be potentially problematic. This thesis illustrates a state of the art approach in identifying factor structure by adding parallel analysis prior to exploratory factor analysis.

Thirdly, this research introduces the adoption of Alkire Foster Criteria (Alkire, Conconi, & Seth, 2014; Alkire & Foster, 2011), to categorise EBI in two group, i.e. environmentally friendly and not-friendly. This is new to the current literature of environmental behaviour.

Finally, this research contributes to the use of psychology in understanding the phenomena of environmental behaviour in Indonesia by utilising the theory of planned behaviour approach, blended with sociodemographic and lifestyle characteristics of the people in the case study. These models are helpful in analysing external factors influencing the current phenomena of people's environmental behaviour.

9.4 Limitations of the study and implications for further research

This thesis opens the door to the understanding of household environmental behaviour. However, this study measures socioeconomic variables (gender, age, education, etc.), and psychological variables, measured on an individual level (i.e. household members who were interviewed through household survey or participated in focus group discussions). This has been done out of practical considerations, as it is not feasible to ask each household member to fill out the full-length questionnaire. The second best option used in this thesis has been that the household member who filled out the questionnaire is assumed to represent the entire household with respect to the psychological variables. Likewise, the perceptions and experiences portrayed through focus group discussions here may not necessarily represent that of everyone in a household.

Furthermore, to expand the understanding of the determinants of EBI, further research should consider exploring more independent variables in the area of physiological research than those included in the study to analyse people's attitude, subjective norms and perceive behavioural control. Other situational variables such as access to public facilities and the cost of environmentally friendly behaviour should also be taken into account.

In addition, this study is based on data collected only from the people (i.e., the 'consumers' of the environment), therefore, in order to broaden our understanding of the complexity of challenges towards environmental behaviour, future research should utilise in-depth interviews with local government officials, members of parliament, local government associations, and non-government organisations involved in the process of environmental protection in the area of research.

Lastly, as explained in Chapter 6, this thesis has adopted a self-reporting method to monitor environmental behaviour. Previous research, such as Greendex (National Geographic & GlobeScan, 2008, 2010), *Survey Perilaku Peduli Lingkungan Hidup* — SPLLH or Survey of Environmentally Aware Behaviour (BPS, 2011a, 2013c) and survey on Environmental Policy and Individual Behaviour Change — EPIC (OECD, 2008b, 2011) also adopted a self-reporting method. However, future research could expand the analysis by adopting direct observation as another approach to monitor the environmental behaviour of the respondents.

9.5 **Policy implications**

According to Steg and Vlek (2009) in order to achieve successful behavioural change, it is necessary to adopt of a combination of strategies. This is in case a failure in one aspect could have a substantial impact on improving environmental behaviour. Based on the findings outlined above, this thesis suggests several policy recommendations to improve environmental behaviour. The recommendations include (1) building environmental awareness through educational programs and campaigns to expand people's perceptions of good environmental behaviour; (2) improving the accessibility of a range of environmentally friendly goods, facilities, and services; (3) providing several government initiatives; and (4) strengthening community programs to combat a lack of altruism and encouraging the potentially perceived norms as the potential EFB influencers.

9.5.1 **Building environmental behaviour awareness**

Many respondents have shown a lack of awareness of environmental behaviour. The household survey and focus group discussions show that many of those involved in the case study do not appreciate environmental problems for what they are (see Chapter 8). A lack of awareness has been mostly acknowledged as the reasons behind the lack of engagement in environmental protection (Barr, 2003). Thus, to be able to make environmentally conscious decisions, people must have both the understanding and information regarding EFB. People should also hold specific practical skills and knowledge (e.g. to be able to sort waste or compost, to consider the environmental characteristics of food products, how to invest in energy and water-efficient appliances etc.).

To raise people's environmental awareness, we need several information campaigns and educational programmes right from the level of schools and universities, through village community meetings, women's groups such as *arisan*[86]. Such campaigns and programmes could include:

1. Providing information about human-induced climate change behaviour to help increase knowledge about issues such as climate change and global warming.
2. Providing information about behavioural options for reducing human-induced climate change, so that households can acquire more knowledge about how they could contribute by adopting environmental behaviour in multidimensional aspects of their daily life.
3. Influencing household attitudes to help strengthen their altruistic values so that they can develop a commitment to act in an environmentally friendly manner.

Although the findings of this thesis shows that the completion of higher levels of education does not automatically translate into the adoption of a more environmentally friendly behaviour, the author of this thesis agrees with Stern (Stern, 2007, p. 23) that:

[86] "An indigenous association which holds regular social gatherings, usually once a month. At a meeting, members contribute a fixed amount of money to a pot, and take turns at winning the sum of money collected via a lottery system" (Djen Amar, 2010, p. 4)

> Educating those currently at school about climate change will help to shape and sustain future policymaking, and a broad public and international debate will support today's policy makers in taking strong action now.

As such, to promote EFB we also need to:

4. Integrate environmental and sustainability education into the school curriculum, continuing education, and professional and workplace training.

9.5.2 **Improving the accessibility of a range of environmentally friendly goods, facilities, and services**

This thesis stresses that limited access to environmental behaviour facilities affects the adoption of behaviour. The household survey shows that many respondents are behaving poorly with regard to the environment whereas discussions in focus groups indicate that the decision to act in an environmentally friendly way decreases with lack of access to affordable and equitable public facilities and services across regions (e.g. public transport and disposal facilities) as well as a range of environmentally friendly goods (lower carbon fuel for transporting or cooking). The issue may be that adequate public facilities/services do not exist and need to be created (see the case of public transport in *Pagarnegara*; and disposal facilities in *Pagarnegara*, *Bumijaya* and *Anyar*). Another issue is that existing facilities may be adequate but inequitable in some way (see public transport facilities in *Kayuara*). The next case says that existing facilities are in good shape and seem to be adequate, but are not being used (as in the case of public transport in *20-Ilir* and disposal facilities in *Kayuara*).

Policy design can respond in numerous ways. For example:

1. Improving the accessibility of environmentally friendly facilities and services.
   This can be done by (1) providing people with various environmentally friendly public transport that is adequate, affordable, time-efficient, and equitable across regions; (2) promoting alternative modes of transport including the construction of cycle paths, (3) addressing problems of a lack of continuity in the travel chain, by introducing a modern integrated transport system that connects all types of public transport, (4) providing adequate and affordable garbage disposal facilities and collection which are equitable across regions (recycling bins, temporary disposal facilities, composting training, etc).

2. Improving the accessibility of environmentally friendly goods.

   This can be done by (1) providing more access to a lower carbon fuel for transportation and for cooking, environment-friendly technology, (2) improving the accessibility of environmentally friendly food etc.

9.5.3 **Providing several government initiatives**

Findings from the household survey and focus group discussions indicate several barriers related to a low of law enforcement and economic issues related to environmental behaviour. To address these barriers, we need to develop government initiatives to increase individual opportunities to act EFB and to make EFB choices relatively more attractive. This can be done by:

1. Addressing a low level of law enforcement by implementing legal measures to make environmentally not-friendly behaviour less feasible and even impossible (e.g. prohibiting littering and ensuring toilets are not built over the water). Such legal measures should be followed by the enforcement of relevant laws and regulations; thus, their violations should be met with some type of punishment.
2. Implementing pricing policies aimed at decreasing prices of EFB and or increasing prices of less environment-friendly alternatives.
3. Implementing a reward and punishment policy. This can be done by providing rewards for EFB (e.g. providing the environmentally friendly people with economic incentives or subsidies) and providing punishment for environmentally not-friendly behaviour (e.g. by introducing taxes and charges).

9.5.4 **Strengthening and encouraging community programs related to environmental behaviour**

People's attitudes on environmental behaviour also matter. Results of focus group discussions indicate that respondents tend to possess a lack of altruism. To help people develop a commitment to act EFB, we need to develop strategies to help strengthen altruistic values. To do this, this thesis recommends the following strategies:

1. Coordinating voluntary initiatives which call for individuals to know, care and act with consideration towards the environment.
2. Encouraging community events, such as *gotong-royong* (see Chapter 8), to increase an individual's perception of belonging to a community or

the shared environment (see Geller, 1995).

neighbourhood; and consequently his/her propensity to actively care on behalf of the shared environment (see Geller, 1995).

Furthermore, as described in Chapter 8, this study shows that the family and society are included as the potential perceived norms that could influence EFB in South Sumatra. Thus, the government should also consider:

3. Encouraging every family to create a culture in which EFB (transport-friendly behaviour, food-friendly behaviour, water-friendly behaviour, etc) is propagated as their daily norm.
4. Embedding environmentally behaviour into the philosophical and cultural tone of the society, as well as in the infrastructure of the entire region.

9.6 Closing remarks

To conclude, this thesis affirms that most people in South Sumatra have not been behaving in a friendly way towards the environment and proper government policies need to take this into account. Since environmentally not-friendly behaviour is preventable, avoidable and treatable if proper environmental policies are provided, thus, to ensure Environmentally Friendly Behaviour (EFB) information on environmental behaviour should be channelled towards the population through various sources. These sources could include a mass media campaign (including social media), formal education, or family sharing. Furthermore, an improvement in people's EFB must also be matched by authorities providing adequate facilities to encourage people to be more environmentally friendly.

Whatever needs to be done to achieve environmentally favourable behaviour, we can start now, by avoiding to refer EFB as someone else's problem, and by changing our own environmentally unfriendly behaviour. Any small effort towards environmentally friendly behaviour will matter in helping protect the environment.

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APPENDICES

APPENDIX 1 Approval

Appendix 1.1. Ethics Approval.

FINAL APPROVAL NOTICE

Project No.:	**7304**
Project Title:	Socio-Demographic Factors as Predictors of Environmentally Friendly Behaviour (EFB) at Household Level in the Province of South Sumatera, Indonesia
Principal Researcher:	Ms Leni Marpaleni
Email:	null0004@flinders.edu.au; marpaleni@gmail.com

Approval Date:	15 July 2016	Ethics Approval Expiry Date:	**28 February 2020**

The above proposed project has been **approved** on the basis of the information contained in the application, its attachments and the information subsequently provided with the addition of the following comment:

Additional information required following commencement of research:

Permissions:
Please ensure that copies of the correspondence granting permission to conduct the research from the Office of Direktorat Jenderal Kesatuan Bangsa dan Politik (Directorate General of National Unity and Politics) in Jakarta and the Village leaders are submitted to the Committee *on receipt*. Please ensure that the SBREC project number is included in the subject line of any permission emails forwarded to the Committee. Please note that data collection should not commence until the researcher has received the relevant permissions (item D8 and Conditional approval response – number 16).

RESPONSIBILITIES OF RESEARCHERS AND SUPERVISORS

1. **Participant Documentation**

Please note that it is the responsibility of researchers and supervisors, in the case of student projects, to ensure that:

- all participant documents are checked for spelling, grammatical, numbering and formatting errors. The Committee does not accept any responsibility for the above mentioned errors.
- the Flinders University logo is included on all participant documentation (e.g., letters of Introduction, information Sheets, consent forms, debriefing information and questionnaires – with the exception of purchased research tools) and the current Flinders University letterhead is included in the header of all letters of introduction. The Flinders University international logo/letterhead should be used and documentation should contain international dialling codes for all telephone and fax numbers listed for all research to be conducted overseas.
- the SBREC contact details, listed below, are included in the footer of all letters of introduction and information sheets.

*This research project has been approved by the Flinders University **Social and Behavioural Research Ethics** Committee (Project Number 'INSERT PROJECT No. here following approval'). For more information regarding* *ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email*human.researchethics@flinders.edu.au.

2. Annual Progress / Final Reports

In order to comply with the monitoring requirements of the *National Statement on Ethical Conduct in Human Research (March 2007)* an annual progress report must be submitted each year on the **15 July** (approval anniversary date) for the duration of the ethics approval using the report template available from the Managing Your Ethics Approval SBREC web page. *Please retain this notice for reference when completing annual progress or final reports.*

If the project is completed *before* ethics approval has expired please ensure a final report is submitted immediately. If ethics approval for your project expires please submit either (1) a final report; or (2) an extension of time request and an annual report.

Student Projects

The SBREC recommends that current ethics approval is maintained until a student's thesis has been submitted, reviewed and approved. This is to protect the student in the event that reviewers recommend some changes that may include the collection of additional participant data.

Your first report is due on **15 July 2017** or on completion of the project, whichever is the earliest.

3. Modifications to Project

Modifications to the project must not proceed until approval has been obtained from the Ethics Committee. Such proposed changes / modifications include:

- change of project title;
- change to research team (e.g., additions, removals, principal researcher or supervisor change);
- changes to research objectives;
- changes to research protocol;
- changes to participant recruitment methods;
- changes / additions to source(s) of participants;
- changes of procedures used to seek informed consent;
- changes to reimbursements provided to participants;
- changes / additions to information and/or documentation to be provided to potential participants;
- changes to research tools (e.g., questionnaire, interview questions, focus group questions);
- extensions of time.

To notify the Committee of any proposed modifications to the project please complete and submit the *Modification Request Form* which is available from the Managing Your Ethics Approval SBREC web page. Download the form from the website every time a new modification request is submitted to ensure that the most recent form is used. Please note that extension of time requests should be submitted prior to the Ethics Approval Expiry Date listed on this notice.

Change of Contact Details

Please ensure that you notify the Committee if either your mailing or email address changes to ensure that correspondence relating to this project can be sent to you. A modification request is not required to change your contact details.

4. Adverse Events and/or Complaints

Researchers should advise the Executive Officer of the Ethics Committee on 08 8201-3116 or human.researchethics@flinders.edu.au immediately if:

- any complaints regarding the research are received;
- a serious or unexpected adverse event occurs that effects participants
- an unforeseen event occurs that may affect the ethical acceptability of the project.

Appendix 1.2. Kesbangpol Approval

Kesbangpol Approval at National Level

KEMENTERIAN DALAM NEGERI REPUBLIK INDONESIA
DIREKTORAT JENDERAL POLITIK DAN PEMERINTAHAN UMUM
Jalan Medan Merdeka Utara No. 7 Jakarta Pusat telp. 021 – 3452456

Jakarta, 22 Juli 2016

Nomor	: 460.08/2894/PolPUM			Kepada
Sifat	: Segera		Yth.	Associate Prof. Gouranga Dasvarma
Lampiran	: -			
Perihal	: Rekomendasi Penelitian Lingkup Provinsi			di - TEMPAT

Menjawab surat Bapak tanggal 18 Juli 2016, kami sampaikan hal-hal sebagai berikut :

1. Berdasarkan Peraturan Menteri Dalam Negeri Republik Indonesia Nomor 7 Tahun 2014 tentang Perubahan atas Peraturan Menteri Dalam Negeri Republik Indonesia Nomor 64 Tahun 2011 tentang Pedoman Penerbitan Rekomendasi Penelitian, Pasal 1 angka 8b dan Pasal 10 di sebutkan bahwa penelitian lingkup provinsi adalah penelitian yang objek penelitiannya hanya meliputi dua atau lebih kabupaten/kota dalam provinsi tersebut, dan rekomendasi penelitiannya diterbitkan oleh gubernur;
2. Hasil verifikasi dokumen yang dilampirkan, kegiatan penelitian Sdri. Marpaleni hanya berlokasi di Provinsi Sumatera Selatan, sehingga proses penerbitan rekomendasi penelitiannya oleh Pemerintah Provinsi Sumatera Selatan melalui Badan Kesatuan Bangsa dan Politik setempat.

Demikian disampaikan dan atas kerjasama yang baik diucapkan terima kasih.

an. DIREKTUR JENDERAL
POLITIK DAN PEMERINTAHAN UMUM
SEKRETARIS DITJEN,

BUDI PRASETYO, SH, MM
Pembina Utama Madya (IV/d)
NIP. 19570108 198703 1 001

Tembusan Yth :
1. Dirjen Politik dan PUM (sebagai laporan);
2. Kepala Badan Kesbangpol Prov. Sumatera Selatan.

Kesbangpol Approval at Provincial Level

PEMERINTAH PROVINSI SUMATERA SELATAN

BADAN KESATUAN BANGSA DAN POLITIK

Jln. Kapten F. Tendean No. 1059 Telp/Fax.(0711) 354715 – 370030
Palembang 31129

Palembang, 05 Agustus 2016

Lampiran : -

Kepada Yth,

1. Kepala Badan Kesatuan Bangsa dan Politik Kota Palembang
2. Kepala Badan Kesatuan Bangsa dan Politik Kabupaten Musi Banyuasin
3. Kepala Badan Kesatuan Bangsa dan Politik Kabupaten Ogan Komering Ilir
4. Kepala Badan Kesatuan Bangsa dan Politik Kabupaten Lahat
5. Kepala Badan Kesatuan Bangsa dan Politik Kabupaten Ogan Komering Ulu Selatan

di -
Tempat

SURAT PENGANTAR
NOMOR : 070/ 692 /Ban.KBP/2016

Kepala Badan Kesbangpol Prov. Sumsel memperhatikan :

1. a. Peraturan Menteri dalam Negeri RI Nomor 64 tahun 2011 tentang Pedoman Penerbitan Rekomendasi Penelitian pada pasal 10 ayat 3, bahwa Bupati/Walikota melalui SKPD yang membidangi Badan Kesatuan Bangsa dan Politik menerbitkan rekomendasi penelitian ruang lingkup Kabupaten/Kota.
   b. Surat Surat dari Sekretaris Direktorat Jenderal Politik dan Pemerintahan Umum, Nomor : 460.02/2894/Polpum, Tanggal : 22 Juli 2016, Hal : Rekomendasi Penelitian Lingkup Provinsi.
   c. Surat dari Associate Professor Gouranga Dasvarma Flinders University, Tanggal : 02 Agustus 2016, Hal : Izin Penelitian.
2. Sehubungan dengan hal tersebut di atas, diminta kepada saudara untuk memberikan rekomendasi penelitian kepada :

Nama	Institusi	Judul Penelitian
MARPALENI, S. Si, MA	Flinders University of South Australia	Faktor-Faktor Sosio – Demografis Sebagai Prediktor Perilaku Ramah Lingkungan (EFB) Pada Skala Rumah Tangga di Provinsi Sumatera Selatan, Indonesia

Demikianlah disampaikan, atas perhatian dan kerjasama yang baik diucapkan terimakasih

KEPALA BADAN KESATUAN BANGSA DAN POLITIK
PROVINSI SUMATERA SELATAN

BADAN KESBANGPOL

RICHARD CHAHYADI, AP, M.Si
PEMBINA UTAMA MUDA/ IV/ c
NIP 197604161994121001

Kesbangpol Approval at Regency/City Level

a. Lahat

PEMERINTAH KABUPATEN LAHAT
BADAN KESATUAN BANGSA DAN POLITIK
Jalan Kolonel H. Barlian Bandar Jaya Lahat ☎ (0731) 322562

REKOMENDASI PENELITIAN

NOMOR : 070/ 12 /Kesbangpol/2016

Kepala Badan Kesatuan Bangsa dan Politik Kabupaten Lahat memperhatikan :

a. Dasar : 1. Peraturan Menteri Dalam Negeri Republik Indonesia Nomor 64 Tahun 2011 tentang Pedoman Penerbitan Rekomendasi Penelitian;

2. Peraturan Menteri Dalam Negeri Republik Indonesia Nomor 7 Tahun 2014 tentang Perubahan Atas Peraturan Menteri Dalam Negeri Republik Indonesia Nomor 64 Tahun 2011 tentang Pedoman Penerbitan Rekomendasi Penelitian.

b. Menimbang : Surat dari Kepala Badan Kesatuan Bangsa dan Politik Provinsi Sumatera Selatan Nomor :070/892/Ban.KBP/2016 tanggal 5 Agustus 2016 tentang Izin Penelitian

Memberikan rekomendasi penelitian kepada :

a. Nama : MARPALENI

b. Jabatan / Tempat/Identitas : Mahasiswa

c. Lokasi Penelitian :
1. Kec. Mulak Ulua Ds. Muara Tiga, Pajar Bulan, Mengkenang
2. Kec. Pagar Gunung Ds. Kedaton
3. Kec. Kikim Tengah Ds. Kepala Siring
4. Kec. Lahat . Ds. Tanjung Payang, Ds, Bandar Jaya
5. Kec. Gumay Talang Ds. Muara Tandi
6. Kec. Merapi Timur Ds. Banjar Sari,Ds. Gedung Agung
7. Kec. Merapi Selatan Ds. Padang .

d. Lama Penelitian : Terhitung mulai tanggal 01 Agustus s.d 31 Oktober 2016

e. Anggota Tim Penelitian : -

f. Bidang Penelitian : Lingkungan

g. Status Penelitian : Baru

h. Judul Skripsi : Faktor- Faktor Sosio- Demografis sebagai Prediktor Perilaku Ramah Lingkungan (EFB) pada Skala Rumah Tangga di Provinsi Sumatera Selatan Indonesia.

Rekomendasi ini diberikan dengan ketentuan sebagai berikut:

1. Rekomendasi ini hanya bagi kegiatan mencari data atau bahan penelitian
2. Mentaati ketentuan yang berlaku.
3. Memperhatikan keamanan dan ketertiban umum sellama kegiatan berlangsung.

4......

4. Memperhatikan adat istiadat setempat.
5. Rekomendasi berlaku selama 3 (tiga) Bulan.
6. Peneliti wajib memberikan laporan hasil penelitian kepada Badan Kesbangpol Kabupaten Lahat selambat-lambatnya 6 (enam) bulan setelah penelitian dilaksanakan.
7. Perpanjangan rekomendasi penelitian dilaksanakan dengan mengajukan surat perpanjangan dengan menyerahkan laporan hasil kegiatan penelitian yang sudah dilakukan sebelumnya.
8. Penelitian yang memakai waktu lebih dari 6 (enam) bulan penelitian wajib mengajukan perpanjangan rekomendasi.

Demikian rekomendasi ini dibuat untuk dipergunakan seperlunya.

Lahat, 14 Agustus 2018
Kepala Badan Kesatuan Bangsa dan Politik
Kabupaten Lahat,

PEMERINTAH KAB... BADAN KESBANG DAN POLITIK L A H A T

SURYA DESMAN, S.IP, MM
Pembina Utama Muda
NIP 196212251983031005

Tembusan Yth :
1. Camat Mulak Ulu
2. Camat Pagar Gunung
3. Camat Kikim Tengah
4. Camat Lahat
5. Camat Gumay Talang
6. Camat Merapi Timur
7. Camat Merapi Selatan
8. Yang Bersangkutan
9. Arsip

b. Palembang

PEMERINTAH KOTA PALEMBANG

BADAN KESATUAN BANGSA DAN POLITIK KOTA PALEMBANG
JL. LUNJUK JAYA NOMOR 3 – DEMANG LEBAR DAUN PALEMBANG
TELPON (0711) 368726
Email : badankesbang@yahoo.co.id

Palembang, 15 Agustus 2016

Nomor : 070 / 334 / BAN.KBP / 2016
Sifat : -
Lampiran : -
Perihal : Izin Penelitian

Kepada Yth.
1. Camat Ilir Barat II kota Palembang
2. Camat Gandus Kota Palembang
3. Camat Seberang Ulu I Kota Palembang
4. Camat Kertapati Kota Palembang
5. Camat Seberang Ulu II Kota Palembang
6. Camat Plaju Kota Palembang
7. Camat Ilir Barat I Kota Palembang
8. Camat Bukit Kecil Kota Palembang
9. Camat Ilir Timur I Kota Palembang
10. Camat Kemuning Kota Palembang
11. Camat Ilir Timur II Kota Palembang
12. Camat Kalidoni Kota Palembang
13. Camat Sako Kota Palembang
14. Camat Sematang Borang Kota Palembang

di-
Palembang

Memperhatikan Surat Flinders University Of South Australia Nomor : 460.02 / 2894/ Polpum / 2016 Tanggal 22 Juli 2016 perihal tersebut diatas, dengan ini diberitahukan kepada saudara bahwa :

No.	*Nama*	*Kelurahan*	*Judul*
1.	*Marpaleni, S.S(.MA*	*Telampir*	*Faktor-faktor Sosio-Demgrafis Sebagai Prediktor Perilaku Ramah lingkungan (EFB) Pada Skala rumah Tangga Di Provinsi Sumatera selatan,indonesia*

Untuk melakukan Penelitian
Lama Penelitian : 15 Agustus 2016 s.d 31 Oktober 2016

Dengan Catatan :
1. Sebelum melakukan penelitian/survey/riset terlebih dahulu melapor kepada pemerintah setempat.
2. Penelitian tidak diizinkan menanyakan soal politik, dan melakukan penelitian/survey/riset yang sifatnya tidak ada hubungan dengan judul yang telah diprogramkan.
3. Dalam melakukan penelitian/survey/riset agar dapat mentaati peraturan perundang-undangan dan adat istiadat yang berlaku didaerah setempat.
4. Apabila izin penelitian/ survey/riset telah habis masa berlakunya, sedang tugas penelitian/survey/riset belum selesai maka harus ada perpanjangan izin.
5. Setelah selesai mengadakan penelitian/survey/riset diwajibkan memberikan laporan tertulis kepada Walikota Palembang melalui Kepala Badan Kesatuan Bangsa dan Politik Kota Palembang.

Demikian untuk dimaklumi dan untuk dibantu seperlunya.

a.n. KEPALA BADAN KESATUAN BANGSA DAN POLITIK KOTA PALEMBANG
KEPALA BIDANG KESATUAN BANGSA

INGRID YOLANDA, S.STP, MM
PENATA TINGKAT I
NIP. 198006081999122001

Tembusan :
1. Flinders University Of South Australia
2. Mahasiswa Yb

PEMERINTAH KOTA PALEMBANG

BADAN KESATUAN BANGSA DAN POLITIK KOTA PALEMBANG
JL. LUNJUK JAYA NOMOR 3 – DEMANG LEBAR DAUN PALEMBANG
TELPON (0711) 368726
Email : badankesbang@yahoo.co.id

Kelurahan
26 Ilir
Silaberanti
KaryaJaya
Plaju Darat Talang Putri
Lorok Pakjo Demang Lebar Daun
15 Ilir Sei Pangeran
11 Ilir Sungai Buah 2 Ilir Duku
Kalidoni
Sialang

a.n. KEPALA BADAN KESATUAN BANGSA DAN
POLITIK KOTA PALEMBANG
KEPALA BIDANG KESATUAN BANGSA

INGRID YOLANDA, S.STP, MM
PENATA TINGKAT I
NIP. 198006061999122001

c. OKUS

PEMERINTAH KABUPATEN OGAN KOMERING ULU SELATAN

KANTOR KESBANG POL DAN LINMAS

Komplek Perkantoran PemerintahKabupaten OKU Selatan (0735) 590770

Jalan Serasan Seandanan Nomor. 01 Muaradua kode Pos 32211

REKOMENDASI PENELITIAN/SURVEI

NOMOR : 070/ 86 /KPL-OKUS/2016

Kepala Kantor Kesbangpol dan Linmas Kab.Ogan Komering Ulu Selatan memperhatikan :

a. Dasar :
1. Peraturan Menteri Dalam Negeri Nomor 64 Tahun 2011 tenteng pedoman penerbitan rekomendasi penelitian.
2. Peraturan menteri dalam negeri republik indonesia nomor 7 tahun 2014 tentang perubahan atas peraturan menteri dalam negeri republik indonesia nomor 64 tahun 2011 tentang pedoman penerbitan rekomendasi penelitian.
3. Peraturan gubernur sumatera selatan nomor 56 tahun 2014 tentang pedoman penerbitan rekomendasi penelitan/survei.

b. Menimbang : Surat a.n Badan Kesbangpol, nomor : 070/892/Ban.KBP/2016 Tanggal : 05 Agustus 2016. Hal : izin melaksanakan penelitian.

Memberikan rekomendasi penelitian/ survei kepada :

a. Nama/Objek	: Marpaleni, S.Si, MA
b. Jabatan/Tempat/Identitas	: Mahasiswa/Australia/2021314
c. Lokasi Penelitian	: Kab. OKU Selatan
d. Lama Penelitian	: 3 Bulan
e. Anggota Tim Penelitian	: -
f. Bidang Penelitian	: Sosio-Demografis
g. Status Penelitian	: Baru
h. Judul Proposal	: Faktor-Faktor Sosio- Demografis sebagi Prediktor Perilaku Ramah Lingkungan (EFB) pada Skala Rumah Tangga di Provinsi Sumatera Selatan, Indonesia

Rekomendasi ini diberikan dengan Ketentuan sebagai berikut :
1. Rekomendasi ini hanya bagi kegiatan mencari data atau bahan penelitian/ survei
2. Mentaati ketentuan yang berlaku
3. Memperhatikan keamanan dan ketertiban umum selama kegiatan berlangsung
4. Memperhatikan adat istiadat setempat
5. Rekomendasi ini berlaku selama 3(tiga) bulan
6. Penelitan wajib memberikan Laporan hasil penelitian kepada Kantor Kesbangpol dan Linmas Kab.OKU Selatan selambat- lambatnya 6(enam) bulan setelah penelitian di laksanakan.
7. Perpanjangan rekomendasi penelitian dilaksanakan dengan mengajukan surat perpanjangan dengan menyerahkan laporan hasil penelitian yang sudah dilakukan sebelumnya.
8. Penelitian yang memakai waktu lebih dari 6 (enam) bulan peneliti wajib mengajukan perpanjangan rekomendasi.

Demikian rekomendasi ini dibuat untuk dipergunakan seperlunya.

a.n KEPALA KANTOR KESBANG POL DAN LINMAS
KABUPATEN OGAN KOMERING ULU SELATAN
KASI PEMBINAAN UMUM DAN LINMAS

Eva Hasanah,SE
Penata
NIP. 197807212007012006

DAFTAR MAHASISWA

NO.	NAMA	KETERANGAN / NIM
1.	Marpaleni, S.Si, MA	MAHASISWA / 2021314

Dikeluarkan di : Muaradua
Pada Tanggal : Agustus 2016

a.n KEPALA KANTOR KESBANG POL DAN LINMAS
KABUPATEN OGAN KOMERING ULU SELATAN
KASI PEMBINAAN UMUM DAN LINMAS

Eva Hasanah,SE
Penata
NIP. 197807212007012006

Tembusan :

1. Bupati Kab.Ogan Komering Ulu Selatan di Muaradua (Sebagai Laporan)
2. Kantor Kementrian Agama Kab. Ogan Komering Ulu Selatan

d. OKI

PEMERINTAH KABUPATEN OGAN KOMERING ILIR
BADAN KESATUAN BANGSA, POLITIK DAN PERLINDUNGAN MASYARAKAT

Jl. Letjen Yusuf Singadekane Kayuagung Provinsi Sumatera Selatan
Telp. (0712) 323606 Kayuagung

SURAT IZIN PENELITIAN/SURVEI/RISET

Nomor: 410 /B.KBPL-Sekrt/2016

MEMBACA : Surat Flinders University of South Australia tanggal 02 Agustus 2016

MENGINGAT :
1. Undang-Undang Nomor 23 Tahun 2014 tentang Pemerintahan Daerah (Lembaran Negara Republik Indonesia Tahun 2014 Nomor 244, tambahan Lembaran Negara Republik Indonesia Nomor 5587) sebagaimana telah beberapa kali diubah dengan Undang-Undang Nomor 9 Tahun 2015 tentang Perubahan Kedua atas Undang-Undang Nomor 23 Tahun 2014 tentang Pemerintah Daerah) Lembaran Negara Republik Indonesia Tahun 2015 Nomor 58, tambahan Lembaran Negara Republik Indonesia Nomor 5679);
2. Peraturan Daerah Provinsi Sumatera Selatan Nomor 9 Tahun 2008 tentang Organisasi dan Tata Kerja Inspektorat, Badan Perencanaan Pembangunan Daerah dan Lembaga Teknis Daerah Provinsi Sumatera Selatan (Lembaran Daerah Tahun 2008 Nomor 3 seri D);
3. Peraturan Gubernur Sumatera Selatan Nomor 79 Tahun 2008 tentang Uraian Tugas dan Fungsi Badan Penelitian dan Pengembangan Daerah Provinsi Sumatera Selatan;
4. Surat Gubernur Sumatera Selatan Nomor: 070/1542/Balitbangda/2001 tentang Pengelolaan Izin Penelitian/survei/riset di Provinsi Sumatera Selatan;
5. Surat Keputusan Kepala Badan Penelitian dan Pengembangan Daerah Provinsi Sumatera Selatan Nomor: 173/A/VI/Balitbangda/2001 tentang Pengelolaan Izin Penelitian/survei/riset di Provinsi Sumatera Selatan.

MEMPERHATIKAN : Surat yang bersangkutan.

DIBERIKAN IZIN KEPADA:

Nama	: Marpaleni
Alamat	: Jl. SMP 4 Lahat Tengah RT. 006 RW. 002 Kelurahan Lahat Tengah Kecamatan Lahat
Pekerjaan	: Mahasiswa
Kebangsaan	: Indonesia
Judul Penelitian	: Faktor-Faktor Sosio – Demografis sebagai Prediktor Perilaku Ramah Lingkungan (EFB) pada Skala Rumah Tangga di Provinsi Sumatera Selatan, Indonesia
Lokasi Penelitian	: Kabupaten Ogan Komering Ilir
Bidang	: Lingkungan Hidup
Lama Penelitian	: 4 (Empat) Bulan
Penanggungjawab	: Professor Gouranga Dasvarma
Maksud/Tujuan	: Izin Penelitian dan Pengambilan Data

Akan melakukan penelitian/survei/riset dengan ketentuan sebagai berikut:

1. Sebelum melakukan kegiatan Penelitian/Survei/Riset harus melaporkan kedatangannya kepada Kepala Badan/Dinas/Kantor, Camat setempat dengan menunjukkan Surat Pemberitahuan/Izin ini.
2. Tidak dibenarkan melakukan Penelitian/Survei/Riset yang tidak sesuai/tidak ada kaitannya dengan Judul Penelitian/Survei/Riset yang dimaksud.
3. Harus mentaati ketentuan sesuai Perundang-undangan yang berlaku serta mengindahkan Adat Istiadat setempat.
4. Apabila masa berlaku Surat Pemberitahuan/Izin ini telah berakhir, sedangkan pelaksanaan Penelitian/Survei/Riset belum selesai, perpanjangan Penelitian/Survei/Riset harus diajukan kembali kepada Badan Kesatuan Bangsa, Politik dan Perlindungan Masyarakat Kabupaten Ogan Komering Ilir.
5. Setelah selesai kegiatan Penelitian/Survei/Riset agar menyerahkan 1 (satu) eksemplar Laporan Hasil Penelitian/Survei/Riset kepada Badan Kesatuan Bangsa, Politik dan Perlindungan Masyarakat Kabupaten Ogan Komering Ilir.
6. Surat Pemberitahuan/Izin akan dicabut kembali dan dinyatakan tidak berlaku, apabila ternyata Pemegang Pemberitahuan/Izin ini tidak mentaati/mengindahkan ketentuan-ketentuan seperti tersebut diatas.

Demikian Surat Pemberitahuan/Izin ini dikeluarkan untuk dipergunakan sebagaimanamestinya.

Kayuagung, 26 Agustus 2016

KEPALA BADAN KESBANGPOL DAN LINMAS
KABUPATEN OGAN KOMERING ILIR

PEMERINTAH KABUPATEN OGAN KOMERING ILIR
BADAN KESBANGPOL DAN LINMAS

PRATAMA SURYADI, SP
Pembina Tk. I
NIP. 197009211990031004

Tembusan:

1. Bupati Ogan Komering Ilir (sebagai laporan)
2. Camat Lempuing
3. Camat Lempuing Jaya
4. Camat Mesuji
5. Camat Pedamaran Timur
6. Camat Teluk Gelam
7. Camat Kota Kayuagung
8. Camat Jejawi
9. Camat Pampangan
10. Yang bersangkutan
11. Arsip

e. MUBA

PEMERINTAH KABUPATEN MUSI BANYUASIN
BADAN KESATUAN BANGSA DAN POLITIK
Jln. Baru Belakang Terminal Randik (Depan SMK Neg. 3) SEKAYU 30711
Telp. / Fax. 0714 - 3330033

REKOMENDASI PENELITIAN/SURVEI
NOMOR : 070/ 411 /BKBP/2016

Kepala Badan Kesbangpol Kabupaten Musi Banyuasin memperhatikan :

a. Dasar : 1. Peraturan Menteri Dalam Negeri Republik Indonesia Nomor : 64 Tahun 2011 tentang Pedoman Penerbitan Rekomendasi Penelitian.
2. Peraturan Menteri Dalam Negeri Nomor 7 Tahun 2014 tentang Perubahan Atas Peraturan Menteri Dalam Negeri Republik Indonesia Nomor 64 Tahun 2011 tentang Pedoman Penerbitan Rekomendasi Penelitian.
3. Peraturan Gubernur Sumatera Selatan Nomor 56 Tahun 2014 tentang Pedoman Penerbitan Rekomendasi Penelitian / Survei.

b. Menimbang : - Surat Pengantar Kepala Badan Kesatuan Bangsa dan Politik Provinsi Sumatera Selatan Nomor : 070 / 892 / Ban.KBP / 2016 tanggal 05 Agustus 2016

Memberikan rekomendasi penelitian / survey kepada :

a. Nama / Obyek	:	MARPALENI, S. Si, MA
b. Jabatan/Tempat/Identitas	:	Jln. SMP 4 Lahat Tengah Rt. 006 Rw. 002 Kel. Lahat Tengah Kecamtan Lahat
c. NPM	:	----
d. Lokasih Penelitian	:	Kabupaten Musi Banyuasin
e. Waktu/Lama Penelitian	:	01 Agustus Sampai dengan 30 November 2016
f. Anggota tim Penelitian	:	- - - -
g. Bidang Penelitian	:	Perilaku Ramah Lingkungan
h. Status Penelitian	:	Baru
i. Judul Proposal	:	Faktor-faktor Sosio – Demografis sebagai Prediktor Perilaku Ramah Lingkungan (EFB) pada Skala Rumah Tangga di Provinsi Sumatera Selatan, Indonesia.

Rekomindasi ini diberikan dengan ketentuan sebagai berikut :

1. Rekomendasi ini hanya untuk kegiatan mencari data atau bahan penelitian.
2. Mentaati semua ketentuan sesuai dengan peraturan/perundangan yang berlaku.
3. Memperhatikan keamanan dan ketertiban umum selama kegiatan berlangsung.
4. Memperhatikan adat istiadat setempat.
5. Rekomendasi ini hanya berlaku sampai dengan 30 November 2016.
6. Peneliti wajib memberikan laporan hasil penelitiannya kepada Bupati melalui Kepala Badan Kesbangpol Kab. Muba selambat – lambatnya 3 (tiga) bulan setelah penelitian dilaksanakan.
7. Rekomendasi penelitian dapat diperpanjang dengan mengajukan surat permohonan perpanjangan dan menyerahkan laporan hasil kegiatan penelitian yang sudah dilakukan sebelumnya.

Demikian rekomendasi ini dibuat untuk dipergunakan seperlunya.

DIKELUARKAN DI : S E K A Y U
PADA TANGGAL : 19 AGUSTUS 2016

KEPALA BADAN
KESATUAN BANGSA DAN POLITIK
KABUPATEN MUSI BANYUASIN

PEMERINTAH KABUPATEN MUSI BANYUASIN BADAN KESBANG DAN POLITIK

H. M. SOLEH NA'IM, SE., MM
PEMBINA TINGKAT I
NIP. 19610324 198512 1 002

Tembusan : Disampaikan Kepada.

1. Yth. Bupati Musi Banyuasin (Sebagai laporan)
2. Yth. Kepala Badan Kesatuan Bangsa dan Politik Provinsi Sumatera Selatan di Palembang
3. Yth. Camat Dalam Wilayah Kab. Muba di Tempat
4. Yth. Lurah / Kepala Desa Dalam Wilayah Kab. Muba di Tempat
5. ---------- A r s i p ------------------

APPENDIX 2: Questionnaire

Appendix 2.1. Household survey questioner

QUESTIONNAIRE
ENVIRONMENTAL BEHAVIOUR RESEARCH
FOR HOUSEHOLD DATA COLLECTION

1. HOUSEHOLD IDENTIFICATIONS			
101	REGENCY/CITY	:	
102	SUB-DISTRICT	:	
103	VILLAGE/WARD	:	
104	URBAN/RURAL	: 1. URBAN 2. RURAL	
105	ARE SAMPLE CODE	:	
106	HOUSEHOLD NUMBER	:	
107	NAME OF THE HOUSEHOLD'S HEAD	:	108. NAME OF THE RESPONDENT ....
109	INTERVIEW DATE	: .... / .... / 2016	(DD/MM/YYYY)
110	NAME OF THE INTERVIEWER	:	111. RESPONDENT'S SIGNATURE ....

1. DEMOGRAPHIC CHARACTERISTICS (FOR ALL MEMBERS OF THE HOUSEHOLD)									
No	**Name**	**Relationship with Household Head:** 1. Household Head 2. Wife/Husband 3. Son/Daughter 4. Other	**Sex** 1. Male 2. Female	**Age**	**Marital Status** 1. Never Married 2. Married 3. Divorced 4. Widowed	**Religion** 1. Islam 2. Christian 3. Hindu 4. Buddha 5. Others	**FOR MEMBERS OF HOUSEHOLD AGE 10 YEARS OLD AND ABOVE**		
							HIGHEST EDUCATION 1. Less than Primary School (Year 6) 2. Primary School 3. Junior High School (Year 9) 4. Senior High School (Year 12) 5. Diploma 1/2/3 6. Diploma 4/S1 7. S2/S3	**MAIN ACTIVITIES** 1. Working 2 .Schooling 3. House-wife/House-husband 4 .others	IF 208 = 1 **MAIN JOB,** LAST WEEK: 1. Farming/forestry 2. Fishery/livestock 3. Mining/quarrying 4. Manufacturing 5. Electricity and gas 6. Construction/building 7. Trading, hotel & restaurant 8. Transportation & warehousing 9. Information, communication, finance, & insurance. 10. Education & health services 11. Public, governmental & individual services 12. Others
	201	202	203	204	205	206	207	208	209
1.									
2.									
3.									
4.									
5.									
7.									
8.									
9.									
10.									

A1.	How frequently do you engage in the activities listed below? 1. Never 2. Seldom/rarely 3. Occasionally/sometimes 4. Frequently 5. Every time 6. Not applicable	Score
1.	Consuming local food	
2.	Consuming fruit /vegetables	
3.	Consuming imported food	
4.	Consuming chicken/poultry	
5.	Consuming beef	
6.	Consuming fish or seafood	
7.	Consuming mineral water (bottled water)	
8.	Consuming home-grown food	
9.	Checking leaks (piped water)	
10.	Having shorter showers	
11.	Using minimal water in the kitchen	
12.	Reusing grey water (from washing vegetables/fruit /rice, ablutions, etc.)	
13.	Turning off electrical devices when they are not used	
14	Using firewood or any other type of biomass for cooking	
15	Covering pot/pan when cooking	
16.	Using energy-saving bulbs	
17.	Using public transport	
18.	Using Pertamax/Pertalite (other than premium)	
19.	Reducing the use of private transport	
20.	Maintaining vehicle's machinery service	
21.	Conducting emission test routinely	
22.	Littering	
23.	Sorting the garbage at home	
24	Composting the garbage	
25.	Dumping the garbage directly into drain/river	
26.	Burning the garbage	

A2.	Do you have the facilities listed below at home? *1. Yes 2. No*	Score
27.	Toilet with septic-tank	
28.	Infiltration trenches, or biopore infiltration holes, or garden/turf in the home environment	
29.	Perennials/annual plants	
30.	Separate bins for organic/inorganic waste	

B1.	How do rate your intentions to own listed facilities, below? **1** **2** **3** **4** **5** *very not intend* *very intend*	Score
1.	Toilet with septic-tank	
2.	Infiltration trenches, or biopore infiltration holes, or garden/turf in the home environment	
3.	Perennials/annual plants	
4.	Separate bins for organic/inorganic waste	

B2.	How do rate your intentions to engage in listed activities, below? 1 2 3 4 5 very not intend very intend	Score
5.	Consuming local food	
6.	Consuming fruit /vegetables	
7.	Consuming imported food	
8.	Consuming chicken/poultry	
9.	Consuming beef	
10.	Consuming fish or seafood	
11.	Consuming mineral water (bottled water)	
12.	Consuming home-grown food	
13.	Checking leaks (piped water)	
14	Having shorter showers	
15	Using minimal water in the kitchen	
16.	Reusing grey water (from washing vegetables/fruit /rice, ablutions, etc.)	
17.	Turning off electrical devices when they are not used	
18.	Using firewood or any other type of biomass for cooking	
19.	Covering pot/pan when cooking	
20.	Using energy-saving bulbs	
21.	Using public transport	
22.	Using Pertamax/Pertalite (other than premium)	
23.	Reducing the use of private transport	
24	Maintaining vehicle's machinery service	
25.	Conducting emission test routinely	
26.	Littering	
27.	Sorting the garbage at home	
28.	Composting the garbage	
29.	Dumping the garbage directly into drain/river	
30.	Burning the garbage	

C.	How do you value listed activities below? 1 2 3 4 5 very not important very important	Score
1.	Consuming local food	
2.	Consuming fruit /vegetables	
3.	Consuming imported food	
4.	Consuming chicken/poultry	
5.	Consuming beef	
6.	Consuming fish or seafood	
7.	Consuming mineral water (bottled water)	
8.	Consuming home-grown food	
9.	Checking leaks (piped water)	
10.	Having shorter showers	
11.	Using minimal water in the kitchen	
12.	Reusing grey water (from washing vegetables/fruit /rice, ablutions, etc.)	
13.	Turning off electrical devices when they are not used	
14	Using firewood or any other type of biomass for cooking	
15	Covering pot/pan when cooking	
16.	Using energy-saving bulbs	
17.	Using public transport	
18.	Using Pertamax/Pertalite (other than premium)	
19.	Reducing the use of private transport	
20.	Maintaining vehicle's machinery service	
21.	Conducting emission test routinely	
22.	Littering	
23.	Sorting the garbage at home	
24	Composting the garbage	
25.	Dumping the garbage directly into drain/river	
26.	Burning the garbage	

C.	How do you value of having facilities below at home? 1 2 3 4 5 very not important very important	Score
27.	Toilet with septic-tank	
28.	Infiltration trenches, or biopore infiltration holes, or garden/turf in the home environment	
29.	Perennials/annual plants	
30.	Separate bins for organic/inorganic waste	

D 1.	To what extent you think that you ought to own listed facilities below according to people/things that are important to you? **1** **2** **3** **4** **5** very not important very important	Score
1.	Toilet with septic-tank	
2.	Infiltration trenches, or biopore infiltration holes, or garden/turf in the home environment	
3.	Perennials/annual plants	
4.	Separate bins for organic/inorganic waste	

D 2.	Please write down any important people/ things you meant in section D1

D3.	According to people/things that are important to you above, to what extent you think you ought to conduct listed facilities below? 1 2 3 4 5 Very not important very important	**Score**
5.	Consuming local food	
6.	Consuming fruit /vegetables	
7.	Consuming imported food	
8.	Consuming chicken/poultry	
9.	Consuming beef	
10.	Consuming fish or seafood	
11.	Consuming mineral water (bottled water)	
12.	Consuming home-grown food	
13.	Checking leaks (piped water)	
14	Having shorter showers	
15	Using minimal water in the kitchen	
16.	Reusing grey water (from washing vegetables/fruit /rice, ablutions, etc.)	
17.	Turning off electrical devices when they are not used	
18.	Using firewood or any other type of biomass for cooking	
19.	Covering pot/pan when cooking	
20.	Using energy-saving bulbs	
21.	Using public transport	
22.	Using Pertamax/Pertalite (other than premium)	
23.	Reducing the use of private transport	
24	Maintaining vehicle's machinery service	
25.	Conducting emission test routinely	
26.	Littering	
27.	Sorting the garbage at home	
28.	Composting the garbage	
29.	Dumping the garbage directly into drain/river	
30.	Burning the garbage	

E.1	If you value yourself, to what extent you are capable to conduct listed activities below? 1 2 3 4 5 Very not capable very capable	Score
1.	Consuming local food	
2.	Consuming fruit /vegetables	
3.	Consuming imported food	
4.	Consuming chicken/poultry	
5.	Consuming beef	
6.	Consuming fish or seafood	
7.	Consuming mineral water (bottled water)	
8.	Consuming home-grown food	
9.	Checking leaks (piped water)	
10.	Having shorter showers	
11.	Using minimal water in the kitchen	
12.	Reusing grey water (from washing vegetables/fruit /rice, ablutions, etc.)	
13.	Turning off electrical devices when they are not used	
14	Using firewood or any other type of biomass for cooking	
15	Covering pot/pan when cooking	
16.	Using energy-saving bulbs	
17.	Using public transport	
18.	Using Pertamax/Pertalite (other than premium)	
19.	Reducing the use of private transport	
20.	Maintaining vehicle's machinery service	
21.	Conducting emission test routinely	
22.	Littering	
23.	Sorting the garbage at home	
24	Composting the garbage	
25.	Dumping the garbage directly into drain/river	
26.	Burning the garbage	

E2.	If you value yourself, to what extent you are capable to own listed facilities below? 1 2 3 4 5 Very not capable very capable	Score
27.	Toilet with septic-tank	
28.	Infiltration trenches, or biopore infiltration holes, or garden/turf in the home environment	
29.	Perennials/annual plants	
30.	Separate bins for organic/inorganic waste	

F 1.	PERSEPTIONS	
1.	IN YOUR OPINION, WHAT IS ENVIRONMENTALLY FRIENDLY BEHAVIOUR? ANSWER:	
2.	HOW FRIENDLY ARE YOU TOWARDS THE ENVIRONMENT? **1 2 3 4 5** *VERY NOT FRIENDLY VERY FRIENDLY*	
3.	WHY? ANSWER:	

Appendix 2.2. FGDs Guideline

Pointers for FGDs

1. How do you define environmentally friendly behaviour?
2. How do you value
   a. Environmentally friendly behaviour in food consumptions
   b. Environmentally friendly behaviour in water consumption
   c. Environmentally friendly behaviour in energy consumption
   d. Environmentally friendly behaviour in the area of transportation
   e. Environmentally friendly behaviour in the area of housing
   f. Recycling.
2. Why is that so?
3. Do you think your culture/religion/family/income/neighbour/community leaders will support you to engage in activities related to environmentally friendly behaviour? Why is that so?
4. Will the opinion from people/things above matter to you?
5. If the opinion matters, which one is the most matter to you? To what extent and why?
6. Do you have any burden to engage in activities related to environmentally friendly behaviour?
7. If yes, what are the burdens? Is it possible for you to overcome each of the burden? In what way?
8. If not, are you still engaging in activities related to environmentally friendly behaviour above? To what extent and why?
9. Have you been behaving environmentally friendly in the daily life? How?
10. Do you think it is common for people in your area to behave friendly towards the environment? To what extent and why?
11. Are you aware of any policies from the government which is designed to strengthen the environmentally friendly behaviour?
12. Do you think this policy will succeed? Why?