



RESIDENTS' PERCEPTION ON THE IMPACTS OF
DEVELOPMENT ON AMBIENT AIR QUALITY IN
GOMBAK DISTRICT, SELANGOR

BY

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ABSTRACT

Malaysia in general and Selangor in specific have been undergoing a rapid and major development in the recent years. The fast development of Klang Valley into an urban area during the last decades has affected many of the environmental issues, especially the air pollution. Many literature review address the sources of air pollution, for instance based on Sacramento Metropolitan Air Quality Management District (2013), it was shown that the construction activities are more likely to produce a high amount of air pollution. Gombak District is located in the Klang Valley and being in this zone the air movement and pollutant levels in the study area are affected by the Klang Valley topography. Gombak District is an area with high density of people and houses that emit a high quantity of air pollutants. Air pollution level in Gombak increased because of development growth. Economic growth made Gombak District a developing area. Many residential, commercial and industrial areas have been constructed and the negativity of this development is the pollution of air. This study was undertaken to examine the quality of the air in Gombak District and the impact of development on air quality in Gombak District, Selangor. Extensive literature study of works related to the topic was undertaken before forming the objectives and research requirements. A questionnaire survey was undertaken with a sample size of 100 as the primary data of the research. The secondary data was obtained from local authorities, reports, articles, etc. Different types of data analyses were carried out to obtain different results. The purpose of literature review was to establish a departure point and to make it easy to understand the research subject. The data obtained from questionnaires survey were analyzed using the statistical program SPSS. Descriptive statistics and tables were generated to easily present the outputs of the survey. The secondary data obtained from Department of Environment in Ministry of Natural Resources and Environment that were collected to study the changes of air pollution index from year 2006 to 2013. The Air Pollution Index (API) daily measurable values were manually calculated to find the monthly average value. Then these data were presented in table to identify the changes of these values from one month to another. Finally, a comparison of two different years was done to show the Air Pollution Index's values changes between the two years. From the findings it was found that air pollution has increased from year 2006 to 2013. Recommendations were made from the findings on the methods of how to reduce the air pollution and improve the air quality. These methods are: enforcement of laws, zoning of land use, land use class order and people awareness campaign. As conclusion, this research has fulfilled its targeted objectives in relation to its topic on the resident's perception on the impacts of development on ambient air quality in Gombak district, Selangor.

ملخص البحث

ماليزيا بشكل عام و سيلانجور بشكل خاص قد ومازالت تتطور بشكل سريعة وكبيرة خاصة في السنوات الأخيرة. هذا التطور السريع لكلاينج فالي إلى منطقة حضرية خلال العقود الماضية قد أثر سلبيا في العديد من القضايا البيئية، وخاصة تلوث الهواء. العديد من الدراسات التي أجريت تعنون مصادر تلوث الهواء بناء على (Sacramento Metropolitan Air Quality Management District (2013))، أنه قد تبين ذلك أن أنشطة البناء والتعمير من المرجح أن تنتج كمية عالية من التلوث الهوائي. تقع منطقة جومباك في كلاينج فالي حيث يكون في هذه المنطقة من حركة الهواء ومستوى التلوث كمنطقة خاضعة للدراسة من تأثيرات من قبل تضاريس كلاينج فالي. منطقة جومباك هي منطقة ذات كثافة سكانية عالية و وبالتالي فيها العديد من البيوت التي تنبعث منها كمية عالية من ملوثات الهواء. مستويات تلوث الهواء في جومباك ازدادت بسبب نمو التنمية فيها. النمو الاقتصادي في منطقة جومباك جعلها منطقة تنموية و تطويرية وحيث قد تم فيها تشييد العديد من المناطق السكنية ، التجارية والصناعية و لكن الجانب السيئ من هذا التطور هو تلوث الهواء الناتج عنها. هذه الدراسة قد أجريت لاختبار جودة الهواء في منطقة جومباك و كذلك تأثير التنمية والتطور على مستوى الهواء في جومباك و سيلانجور. الدراسات الواسعة التي أجريت ذات الصلة بالموضوع قد بدأت من قبل أن تشكل الأهداف ومتطلبات البحث. وكان الاستبيان الذي تم على عينة من 100 شخص كبيانات أولية للبحث حيث أن تم الحصول على البيانات الثانوية من السلطات المحلية ، تقارير، مقالات و الخ. حيث جرت تحليل أنواع مختلفة من البيانات من اجل الحصول على نتائج مختلفة. وكان الغرض من القراءة للدراسات التي تمت من قبل هو لإنشاء نقطة انطلاق وجعله من السهل أن يستوعب موضوع البحث. وقد تم تحليل بيانات المسح التي تم الحصول عليها من الاستبيان باستخدام برنامج الإحصاء SPSS. الإحصائيات والجداول التي تم توليدها كانت لأجل عرض نتائج المسح على نحو أسهل . البيانات الثانوية تم الحصول عليها من قسم البيئة في وزارة الموارد الطبيعية والبيئة والتي تم جمعها لدراسة التغيرات في مؤشر تلوث الهواء من عام 2006 إلى عام 2013. إن القيم القابلة للقياس من مؤشر تلوث الهواء (API) يوميا كانت محسوبة يدويا من اجل العثور على قيمة المتوسط الشهري. وبالتالي قدمت هذه البيانات في الجدول لتحديد التغيرات في هذه القيم من شهر إلى آخر. وأخيرا، قد تم إجراء مقارنة بين عامين مختلفين لإظهار قيم مؤشر تلوث الهواء بأنها تتغير بين هذين العامين. ومن النتائج تبين أن تلوث الهواء قد زاد من العام 2006 إلى عام 2013. والتوصيات التي تم إعدادها من النتائج المحصول عليها على طرق كيفية الحد من تلوث الهواء وتحسين جودته. هذه الأساليب تتمحور في : إنفاذ القوانين، وتقسيم المناطق لاستخدام الأراضي، و درجة ترتيب استخدام الأراضي و حمله توعية للناس. وفي الختام، هذا البحث قد أوفى وحقق أهدافه فيما يتعلق بالموضوع على إدراك المقيم وفهمه على آثار التنمية والتطور وتأثيره على نوعية وجودة الهواء المحيط في منطقة جومباك و سيلانجور.

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Urban and Regional Planning.

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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*This dissertation is dedicated to
Brunilda Basha & Dania Tahiri*

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In the name of Allah the Most Beneficial, the Most Merciful

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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

This chapter introduces the needs of the study, objectives, research questions, scope of the research and research framework. This dissertation is focusing on the level of impact of development on air quality in Gombak District, Selangor. Gombak District is located in the state of Selangor that is part of Klang Valley which is one of the most important economic regions in Malaysia. Recently, in the present years we are witnessing a major development of Malaysia in general and Selangor in specific. This rapid change of Malaysia is part of the significant initiative taken by former Prime Minister Dr. Mahathir Mohamad to make this country a developed one, with the formulation of Vision 2020.

Due to the economic rapid growth, many implications have taken place in terms of physical, environment and social dimensions. For instance, the environmental quality has generally slightly degraded. In this context the air quality is one of the affected environmental elements that is associated with the development changes.

As such this dissertation analyses the air quality in Gombak District which is part of Klang Valley region that has seen a rapid growth in the recent years. Ahmad (2012) mentioned in his study that, the fast development of Klang Valley into an urban area during the last decades has affected many of the environmental issues, especially the air pollution.

In relation to the caused factor, the Sacramento Metropolitan Air Quality Management District (2013) has proven that the construction activities are more likely

to produce a high amount of air pollution within urbanized areas. Even though the emissions from construction are provisional until the development is completed, in some projects the emissions released in the nature represent the highest air quality impact.

1.2 BACKGROUND OF STUDY

Even though not in a big extend, human being have been dealing with air pollution since the early times when they started to use fire to warm up themselves and to cook. Later on when the fuel started to be used the impact on the environment was bigger and the air pollution was higher and human being started to feel the discomfort of this pollution.

Historical background shows that the Industrial Revolution began in 1700's in Great Britain and spread to the rest of the world. This industrialization, by using more machinery for mass production, needed more raw materials, so the use of natural resources was uncontrolled and so was the pollution. But the effects of this pollution were seen only after many years. Air quality was also significantly affected. Many people died because of air pollution. Great Britain can be mentioned as an example, where in 1873 within a week 700 people died by smog. The biggest disaster because of air pollution is recorded in December 1952 known as the Great London Smog where about 4000 people died.

When the world population increased drastically in the last century and when the people started to move into urban areas air pollution became tremendously an important issue. This happened because there was a rapid growth of industries and

development of many countries that led to the increased of fuel combustion (Admassu and Wubeshet, 2006).

Many historical records indicate that there is a strong relationship between the development growth and air quality as evident in many countries.

1.2.1 Air Pollution in the World

In the 20th century because of the history in the people mind, any problem with air pollution was related with the city of London. In the 18th century some amount of coal were brought from Newcastle into London for fuel. But the population was growing as well as the manufacturing activities, so the coal burning was increased. This happened regardless of the protests done by the simple people and by the monarchs because of the smell of burning coal. In spite of these protests, the burning of coal increased even faster than the growth of population, and in the 19th century London became air pollution capital of the world (Admassu and Wubeshet, 2006).

United States being as one of the most developed countries in the world is also one of the countries mostly and early affected by the air pollution. To avoid catastrophically disasters from the polluted air by burning of coal, they started to put regulations. In 1867, an order was released saying that smoke stacks should be at least 20ft higher than the closest building. Also in Chicago, the City Council approved in 1881 the notion of smoke regulation (Springer 2010).

Another city is Pittsburgh, that use to be one of the most polluted city in the United States having bad impact of smoke on goods and human health as well, started to be one of the first cities in increasing the public awareness. In 1950's and 1960's the coal was replaced with gas oil and this reduced the smoke in the air, but other

pollutants like automobiles started to increase again the air pollution (Admassu and Wubeshet, 2006).

Today the polluted air has been widening in a global scale. We no need any more to travel in London or Pittsburg to see how the air pollution looks like and what are the bad impacts that it has on the environment in on human health itself. Every metropolitan city in the world being developed or developing, being in America, Europe or Asia is facing the problem of air pollution and they are trying in every way and cost to reduce the impact of their development in the air quality. Only then the consequences of pollution into the environment and their inhabitants itself will be reduced.

1.2.2 Air Pollution in Malaysia

In the early point of Malaysian history, the air pollution was not an issue. After the independence in 1957, the country started to be urbanized and having the ambition to become a developed one. This provided more job opportunities mostly in industry, and the economy started to increase. But this development affected the air quality and within few decades the topic of air pollution came out. In terms to prevent the bad impact of air pollution on the population health, the Department of Environment of Malaysia (DOE) in 1989 prepared some regulation for air quality called Recommended Malaysian Air Quality Guidelines (RMG) for air pollutants.

These guidelines will determine the maximum concentration of specific air pollutants in the air. Then in 1993, the Department of Environment based on RMG came out with Malaysian Air Quality Index (MAQI). Being in line with other

countries in the region in 1996, the index was revised and the Air Pollutant Index (API) was implemented (Department of Environment, 1997).

Areas considered as being seriously air polluted are associated with industrial development such as, Petaling Jaya. Petaling Jaya is considered to be highly affected from air pollution. This is due to its development as a residential-commercial- and industrial area. Penang is another casualty on air pollution due to development that is taking place in the recent years. As stated in Penang DOE Annual Report 2011, development projects have caused the destruction of 70% of mangrove forests.

1.3 PROBLEM STATEMENTS

Gombak District is located in the Klang Valley, and being in this zone the air movement and pollutant levels in the study area are affected by the Klang Valley topography. This situation contributes a heavy condition, where all the air pollutants are trapped down to the valley area (Awang *at.el*, 2000). Even though the air pollution in this area has not reached a critical level as in other metropolitan cities, but it has been increased obviously over the years.

The number of people residing in Gombak District has increased recently, making the study area a densead population area, which has 682,226 people (Census 2010) comparing to 569,081 people that were in 2000 (Census 2000). There were 113,145 additional people living in Gombak District. This increasing number of population requires a bigger number of houses, working place, shops etc. So Gombak is an area with high density of people and houses that emit a high quantity of air pollutants.

Moreover, economic growth made Gombak District a developing area. Many residential, commercial and industrial areas such as Taman Bolton, Taman Sri Gombak, Batu Caves, etc., have been constructed and the bad side of this development is the pollution of air. Air pollution level in Gombak increased because of development growth. This can be seen from the Air Pollution Index (API) data recorded by Department of Environment (DOE). They have a network of 51 stations throughout the whole country, providing a daily monitoring of air quality in different areas from residential to industrial. There is a station monitoring the air quality for Gombak District located in Batu Muda. These data starting from end of 2005 are available in the website of Ministry of Natural Resources and Environment.

1.4 RESEARCH QUESTIONS

Based on the problems mentioned, this study will specifically answer the following questions:

- a) What is the current status of air quality in Gombak District?
- b) How does development give impact to the air quality in Gombak District?
- c) What methods need to be undertaken to reduce the air pollution in Gombak District?

1.5 AIM AND OBJECTIVES

The aim of this study is to examine the quality of the air in Gombak District and how development can give impact to air quality. To achieve this aim the following objectives have been developed.

- a) To analyze the quality of air and its trend in Gombak District

- b) To identify residents' perception on the impact of development on ambient air quality in Gombak District
- c) To give recommendation on how to reduce the ambient air pollution in Gombak District

1.6 SCOPE AND CONTEXT OF RESEARCH

The scope of this dissertation consists of the elements and components that are going to be studied. The elements that are not going to be studied are not within the scope of this dissertation. Therefore, the scope of this study consists of:

1.6.1 Contextual

This research will be concentrating on the impact of development on air quality in Gombak District. Therefore, this study will not cover other types of air pollution such as car exhausting, indoor air pollution etc. This study will also not focus on other kinds of pollution like water pollution, noise pollution etc.

1.6.2 Sources

Since this study will focus on the impact of development on air quality, only common pollutants will be taken into consideration, that are; Carbon Monoxide (CO), Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Ozone (O₃), and Particle Matter (PM₁₀). Other pollutants will not be considered such as; Hydrocarbons (HC_s), Plumbum (Pb) etc.

1.6.3 Spatial

The study was applied only in the area of Gombak District, but within this area several locations were selected, in developing and not developing parts. These spots were chosen after the observation done in identifying the pollution of air by ongoing developments. After they were selected, the spots were studied to get rational outputs from the data collected. In summary, the scope is shown in table 1.1

Table 1.1: Scopes of the research

	Remarks
- Contextual	- Air quality in Gombak District
- Sources	- CO, NO ₂ , SO ₂ , O ₃ and PM ₁₀
- Spatial	- Selected areas in Gombak District – Batu Caves, Gombak Setia, Rawang and Hulu Kelang.

1.7 SIGNIFICANCE OF THE RESEARCH

There are not many studies conducted on air pollution particularly in Selangor and especially the impact of development on air quality. Therefore, this research is undertaken to make available more comprehensive information on the air pollutants and the impact of development on air quality, especially in Gombak District. The findings of this study will contribute in many aspects:

1.7.1 Professionals

This research will help all built environment professionals such as architects and planners, to be more aware of the responsibility that they have while designing, not just to fulfill human needs, but also to protect the air quality within limited standards for the good of human itself.

1.7.2 Community

This research will help in raising the issue of air pollution, especially in Gombak District and making people more conscious about the air pollution, its impact on their life and the importance of having a good quality of air for themselves to breath. This is important because after all people are behind all the factors contributing to air pollution. If people are aware and responsible for their acts, the bad impact of their activities to the quality of air will be reduced.

1.7.3 Local authority

This research will help the local authorities in terms for them to provide guidelines and regulations to be followed by developing sites to protect the air quality. By this research, the relevant authorities can understand the current situation pertaining to the subject more specifically.

1.7.4 Knowledge

This study will be helpful to researches as reference for future studies on the same topic. This study contributes in the field of air quality and air pollutants by providing