Study on Impact and Adjustment of Community around the Cement Industry in Rawang, Selangor

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Abstract. This paper discusses public response on human adjustment to quarry and cement industries in Rawang, Selangor. These activities resulted in dust and flying fine debris that affected human daily life. The discussion in this article includes primary and secondary data collection methods. The outcome from respondent reports showed these activities have resulted in disturbance to the environment, environmental health, safety and their dwellings. Resident responses also showed these activities resulted in negative implications to the people and the physical environment. Following which the residents were forced to have their daily life activities adjusted to the changing environment from these industrial activities. Several suggestions were proposed for actions to be taken by the relevant authorities.

1. Introduction

The cement industry in Malaysia grows rapidly in line with the mass development where construction activities require high quality concrete materials. Local communities should have environmental awareness aimed at encouraging them to be more aware of environmental issues around them such as the impact of quarry and cement industries. Environmental awareness usually exists either formal or informal state [1]. Apart from that, feedback and adaptation provided by humans is essential in improving the quality of the physical environment and the human environment in Rawang, Selangor. The cement industry in Rawang is operating in a residential zone which less than 2 km from Rawang city center. Hence, this study was conducted for feedback and adaptation made by the residents of Rawang more closely in addressing environmental issues and the effect of cement industry.

2. Methods

The MPS 2020 Local Plan (RT) area covers the entire Gombak district located under the administration of the Selayang Municipal Council (MPS). The total area of the MPS is 54,559 hectares (Tabel 1). The MPS area covers three districts which is Mukim of Rawang, Mukim of Batu and Mukim of Mukim. The RT area is bordered by the Federal Territory of Kuala Lumpur, Hulu Langat and Petaling Jaya in the South. The purpose of this study was to determine the impact of the cement industry on the residents of Rawang. The study area covers Rawang located 25 km from Kuala Lumpur city center. It is a small town considered as suburbs or urban fringe to Kuala Lumpur [2]. The development process of Rawang
involves the development of a major settlement center in Rawang (26,314 hectares). Rawang also has a large quarry area equivalent to 22.3 percent of industrial area in Rawang Industrial Area and Ulu Kuang. There are 38 housing estates and there are 11 main villages.

The number of urban residents by area shows that the population of Rawang in 1991 was 24,505 people and increased to 65,769 people in 2000. The results showed an increase of 41,264 people within 10 years or an increase of 62.8%. However, this population increase should be look thoroughly since the activity of quarry and cement industry is within the area of housing that disturbs the everyday lives of the residents. This factory selected because suitable with objective and objective in studies namely identify environmental impact and people adaptation towards cement plant industry effect.

| Table 1. Block, Area, Percentage |
|---------------------------------|
| Block            | Area (Hectare) | Percentage (%) |
| Selayang - Sri Gombak | 5,926         | 10.86          |
| Sungai Buloh       | 2,064         | 3.78           |
| Rawang - Lagong Mas| 4,941         | 9.06           |
| Kota Elmina - Kuang | 4,263       | 7.81           |
| Uia - Gombak       | 2,172         | 3.98           |
| Rawang Country Homes | 3,507       | 3.507          |
| Batu Arang – Tasek Puteri | 4,066       | 4.066          |
| Taman Buah-Buahan Selangor | 4,513    | 8.27           |
| Kawasan Peneliharaan | 23,107       | 42.35          |
| Total             | 54,559        | 100.0          |

Source: Selayang Municipal Council, 2010

Information about respondents is devoted from the various aspect which is race, gender, age, number of households, educational level, occupation, salary, type of residence and duration of living in Rawang. Of the 150 respondents, it was found that Indian respondent were the highest with 69 (46%), followed by 46 Chinese respondents (30.7%), 29 Malay respondents (19.3%) and the rest followed by other races. This study used methods that involves the collection of primary data, secondary data, library studies and primary data analysis. Sample selection of 150 respondents determined by the time and financial factors of the researcher. In this study, the data were analyzed using descriptive statistics and inferential statistics. In order to detect the effects of quarry and cement activity, each selected respondent is residing or settling adjacent to Lafarge's cement site and cement processing plant. The respondents selected using simple random sampling techniques as they are more practical in terms of cost, time and employment [3]. After that, data analyzed by using correlation coefficient method. This methodology objective is to measure strength of connection (association) between two variables that can be calculated and determined.

3. Results and Discussion

3.1. Air Pollution Awareness

Study results found after cement plant construction, air quality in placing area that near polluted. Pollutant identified is dust and ash. A total of 89% respondents agree that air pollution in areas around cement plant happen. Based on the visibility aspect, many respondents expressed the environment getting dusty in the afternoon and the temperature was getting hotter. With the disturbed level of visibility is also causing trouble to resident to commute from home to work. 77% of respondents stated that the level of sight was disturbed and less clear. Respondents staying less than 1 kilometer found smoke and dust departure into the air at night. This opinion was agreed by 53% of respondents while 41% of respondents were unsure and only some respondents disagreed with only showing 6%. The cement plant produces a lot of dust and dust and affects its environment in the study of cement plants in the United States from 1996 to 2001[4].
Table 2. The main cause of air pollution in Rawang

| Main Cause                  | Frequency | Percentage |
|-----------------------------|-----------|------------|
| Quarry activities           | 59        | 39.3       |
| Cement processing plant     | 91        | 60.7       |
| Total                       | 150       | 100.0      |

60.7% of respondents agree and believe that cement processing plant is a major source of air pollution in Rawang (Table 2). 59 (39%) respondents said air pollution in Rawang was due to the activity of explosives in quarries using dynamite. Respondents also said the air pollution was due to Lafarge’s cement processing plant which operated for 24 hours non-stop to further promote air pollution as well as smoke generated by lorries and containers coming out.

3.2. Change of Way of Life and Human Adjustment

There are various terms that are closely related to the change. In normal circumstances the change is the result of the modification of past behavior to adapt it to a new situation [5].

Table 3. Change of way of life

|                      | Frequency | Valid Percentage |
|----------------------|-----------|------------------|
| Strongly experienced | 13        | 8.7              |
| Experienced change   | 63        | 42.0             |
| Not experienced change| 48        | 32.0             |
| Do not know          | 26        | 17.3             |
| Total                | 150       | 100.0            |

The results showed that 42% said they had a lifestyle change, 32% of the respondents said they did not experience any change in lifestyle, 17.3% did not know and 8.7% were strongly experienced change (Table 3). A total of 42% of respondents said they had changed their way of life due to the activities of quarry and cement. Among the most frequent changes made by the respondents were closing doors and windows with the aim of reducing dust (40%), focusing on healthcare aspects (25.3%), limiting outbursts (13.3%), using mouthpiece and nose (12%) and 9.3% of the respondent is more sensitive to aspects of safety (Table 11). In addition, some respondents used barrier tools to prevent dust entry on the windows and garage windows. Some respondents also plant more green plants such as flower trees as heat traps in addition to beautifying the landscape.

Table 4. Changes that made by respondent.

|                                    | Frequency | Valid Percentage |
|------------------------------------|-----------|------------------|
| Limiting outdoor activities        | 20        | 13.3             |
| Using mask / nose cover            | 18        | 12.0             |
| Closing doors and windows to reduce dust from entering | 60 | 40.0 |
| More sensitive to health           | 38        | 25.3             |
| More sensitive to safety           | 14        | 9.3              |
| Total                              | 150       | 100.0            |

The study found that 36.7% respondent is over 2 km from the Lafarge cement processing plant, 23.3% is between 100 and 500 meters, 10 respondents are at 500 meters to 1 km and 50 respondents are at 1 to 2 km. Most of the respondents between 100 and 500 meters are staff / workers living in the Lafarge quarters located next to the cement plant. The effect of cement activity can be seen more clearly as the distance between the quarters with the cement plant is less than 100 meters. 44.7% of
respondents stated that the distance of their home to the quarry site is 1 to 2 km, 28.7% 500 to 1 km, 18.7% exceeding 2 km and 8% of the respondent has a distance of 100 to 500 meters from their home to the quarry site. The study found that a Hindu temple is located less than 500 meters from Lafarge's quarry site which has experienced cracking effect every time an explosion occurs.

3.3. Impact on Material
Studies on the effects of quarry and cement activities on materials can be seen in the aspect of windows, floors and furniture covered with dust, dust on clothes being dried, fractures on the walls of the house and floor and cracked windows. One of the consequences of cement dust production is causing window mirrors and furniture covered with cement dust. Almost all respondents face this problem especially the respondents which living close to the Lafarge factory, but the strength and frequency may vary by the distance. Locations which nearby to the cement dust sources were at Kuanters Lafarge and Kg. Dato ‘Lee Kim Sai while Rawan Perdana and Taman Desa Kuala Garing suffered dust pollution from quarry operation. The study found that most housewives’ complaint about dust problems. Study also found cement plant influence towards agriculture, placing area and business premise increase further frequency cost wash area. Majority of the respondents namely 86% agree cost of living and daily activity increase due to pollution from cement plant followed by 11% uncertain respondents and 3% more do not agree. According to study interview, respondent involved forced and frequently clean tree leaves one day. Cost of energy usage namely manpower (wage) and oil to start engine also rising.

3.4. Problems and Impact on Health
Based on the health aspect, some health problems are being questioned about the diseases faced by residents living near the cement plant area. The findings show that diseases such as cough, fever, sore eyes, asthma, myopia, eye cancer and respiratory disorders are a common problem for locals. Most respondents stated that the most common health problems are coughing, eye irritation and respiratory disorders. The majority of respondents experienced health problems such as eye irritation, cough and respiratory disorders. Dust and dust and the condition of the unclean water can invite other dangerous diseases [6].

The cough problem is due to the residential area near the cement plant. A total of 51% of the residents said that the dust and dust flying around 10.00 am and above caused the eyes to be watery and sore while 25% and 24% said that they were uncertain and disagree with the problem. Difficult to breathing is the highest amongst locals living around the cement plant. 74% of respondents said they often experienced a problem of respiratory illness. Only 18% of respondents are uncertain and 8% of respondents disagree. The researcher found that the symptoms include cough, phlegm, sore throat, nasal congestion and breathing difficulties arising from quarry and cement plants[7]. According to him again the suspended particles and the cement plant dust contributes to the problem of respiratory infection among children and the elderly. Daily human activity near the cement plant will increase PM10 levels[8]. The suspended particles and dust from this cement plant can cause asthma, blindness and eye cancer and can be fatal. The results showed that 10% of respondents agreed that air pollution caused asthma and 48% of respondents were unsure and 42% did not agree. Based on myopia aspect, 33% of respondents agreed that air pollution is a factor in this problem (Table 5).

| Situation                  | Agree | Uncertain | Disagree |
|----------------------------|-------|-----------|----------|
| Coughing                   | 44%   | 25%       | 31%      |
| Frequently experienced in fever | 15%   | 46%       | 39%      |
| Sore eyes                  | 51%   | 25%       | 24%      |
| Suffer from asthma         | 10%   | 48%       | 42%      |
| Myopia                     | 25%   | 37%       | 30%      |
| Eye Cancer                 | 1%    | 53%       | 46%      |
| Lung Disease               | 11%   | 44%       | 45%      |
| Difficult to breath        | 74%   | 18%       | 8%       |
The study of air pollution with health problems showed that 40% of respondents did not experience any illness, 18% had asthma, 14.7% skin allergy, 13.3% cold, 8.7% tuberculosis and 5.3% more heart problems. The study found that the disease was not concentrated only on respondents’ residential areas.

3.5. Problems and Impact on Human Activity
Marketing of agricultural products that is increasingly decline due to cultivation that does not cause result that is appropriate and often damaged. Based on marketing of agricultural products, 60 respondents agree that agricultural produce rated output decline because agricultural produce does not cause result that is appropriate since cement plant construction that close to their residential area, 38% respondents represent as many as 38 people (60 %) uncertain will marketing of agricultural products reduction and only 2% respondents only that disapproved by marketing of agricultural products decrease of rate that due to the cement plant development factor.

In agricultural produce aspects of production, 62% respondents agree that production rate and agricultural produce sale decline since cement plant construction. Remainder namely 33% uncertain respondents will decrease of production and result, followed 5% respondents disapproved by the factor. According to study that is done by Muhammad Zafar Iqbal[9],dust pollution and cement plant dust showing chemical material that there is around factory exceed quantity and dangerous to growth and plant expansion. Above land, he find out pH land is high namely about 9.53 and this proven pH contain calcium, alkaline (2.45 meq / 1), and chloride. This condition is less suitable to cultivation of various type of crop.

4. Conclusions
The quarry activity and the cement industry in Rawang have created pollution on the environment and has disturbed the well-being and comfort lifestyle. To assess the environmental pollution mechanism, research on pollution sources including operations involved in quarry and cement processing activities is very important and necessary. Efforts to inculcate environmental awareness in a community are an essential prerequisite towards achieving various environmental conservation programs. Hence, a very broad role for a country like Malaysia should be dealt with between state governments and local authorities. Therefore, the Selayang Municipal Council should be more proactive in approaching community communities in its administrative districts with various forms of environmental awareness activities so that issues involving a reduction in the quality of life can be addressed from the beginning. Overall, the results of the study on the impact of cement plant on cement plant in Rawang and community action on pollution produced by the cement plant indicated that cement processing activities had a variety of negative effects on plants, health, soil, temperatures, and residents living close to the plant. The distance of the cement plant industry with the settlement area creates a variety of problems including road congestion, dust and dust pollution and some other health problems.

References
[1] Mohd Zuhdi Marzuki 2004 Environmentalisme Dalam Tatabaru Dunia. Dewan Bahas dan Pustaka Kuala Lumpur
[2] Selayang Municipal Council Structural Plan 2009 Selayang Municipal Council
[3] Ahmad Madzan Ayob 2002 Socio-economic research method Kuala Lumpur: Dewan Bahasa dan Pustaka
[4] Stern A C 1976 Air Pollution: Measurement, Monitoring, and Surveillance of Air Pollution. New York: Academic Press.
[5] Jaafar Muhamad 1999 Organizational Behaviour Leeds Publications. Kuala Lumpur.
[6] Daniel J Hogan 1994 Occupational Skin Disorders: Occupational Skin Disease. University of Michigan: Igaku-Shoin.
[7] Shamsul 2001 All disclosures to PE10 and his relationship with symptom respiratory problems. Medical scholar. Kuala Lumpur: Universiti Kebangsaan Malaysia.
[8] Zainol A M 1999 Air pollution by ternafas (PM10) and the relationship’s sugar cane with lung function disease to children in school around cement plant. Master Community Health. Kuala Lumpur: Universiti Kebangsaan Malaysia.

[9] Muhammad Zafar Iqbal and Uhamad Shafiq 1998 Periodical Effect of Cement Dust Pollution on the Growth of Some Plant Species. Pakistan: Department of Botany University of Karachi.

[10] Lamborn S D 1996 Ethnicity and Community Context as Moderators of the Relations between Family Decision Making and Adolescent Adjustment. Child Development first published 1996.