

Human Awareness of Urban Climate Change Effects on Health in Ipoh City, Malaysia

¹Mohd Hairry Ibrahim, ¹Kamarul Ismail and ²Mazlini Adnan
¹Department of Geography and Environment, Faculty of Human Sciences,
²Department of Mathematic, Faculty of Sciences and Mathematic,
Sultan Idris Education University, Tanjung Malim, Malaysia

Abstract: This study analyse human awareness toward the impact of urban climate changes effect on health in Ipoh City, Perak. These effect happened due rapid urban surfaces changes. Rapid urbanisation resulted in industrial and population increment include businesses and commercials expansion that brought wider open surface in Ipoh. Element of urban climate changes such temperature and air pollution has also been associated to contributing factor that resulted in urban climate change in Ipoh City. The discussion in this study will be based on primary and secondary data from survey about urban climate change awareness and its effect to human health in Ipoh City. The analysis are limited to descriptive and inference statistics. The finding found that 534 respondents from Ipoh population stated that they alert about urban climate changes had been disturbed by rapid urbanisation. About 463 of these respondent (86.7%) agreed that warmer climate happened in the centre of Ipoh compared to the suburban. This can be associated to possible urban heat island having developed in Ipoh area. The result also found a significantly awareness toward health effect from cement industry and quarry activities which have negative feelings among the local resident and their appreciation on urban environment changes. Lastly, several suggestions were proposed to manage the urban climate change dan health in Ipoh City.

Key words: Urban climate wareness, urban health awareness, urban climates change, urbanization, urban environment

INTRODUCTION

Urbanization changes alter the physical environment to the business, industrial, commercial and residential. In Ipoh, Malaysia, urbanization has led to a higher number of vehicles, industrial, population and thus, causes heavy vehicular traffic. As a result, the level of air pollution increases in the city atmosphere. Sham (1982), highlighting the most pollution in Malaysia is due to the economic development plans, population and urban growth and rapid expansion. In addition, the natural resources in the surrounding area used for the cement and quarry industry in Ipoh. Temperature increases due to the urbanisation on Ipoh are of concern and many early studies have been conducted before this in order to understand the temperature changes (Hizam, 1993; Normazidah, 1990). Temperature trends used in many studies are popular ways to evaluate urban temperature changes due to urban change have also been used to evaluate urban warming trends (Chung *et al.*, 2004; Fujibe,

1998; Kato, 1996). Annual temperature variations and temperature changes in Ipoh were analyzed with linear trend showed a significant result (Ibrahim *et al.*, 2011).

The present study is an attempt to look into the human awareness the effect of urban climate changes to environmental health in Ipoh. The study identifies a variety of awareness and adaptation to climate change and aspects of urban air pollution. In addition, this study seeks the climate management Ipoh as sustainable management of cities in Malaysia.

MATERIALS AND METHODS

The present study was carried out by conducting a questionnaire survey at five Planning Development Block (PDB) of Ipoh during the month of April 2011 (Fig. 1). Its based on the projected number Planning Development Block (PDB) in 2010, estimated at 550,000 population. Data sources included primary data via a questionnaire with a samples of 534 samples respondent. In addition, the

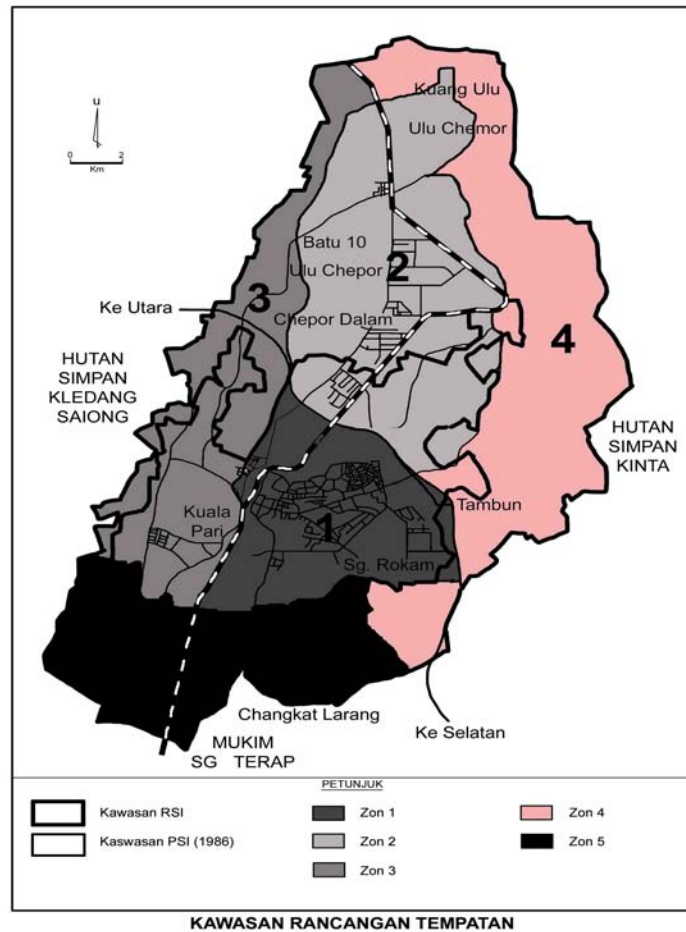


Fig. 1: Research area: five Planning Development Block (PDB) of Ipoh

use of secondary data related to population demographics and background of Ipoh. Respondents from the households in the study were visited and interview was requested on Saturdays and Sundays. The samples selected were based on determining sample size for research activities by Krejcie and Morgan (1970) and samples distribution based on stratified sampling method. The analysis are limited to descriptive and inferential statistics. The analysis is descriptive using frequency and mean only of the phase one for this study.

RESULTS AND DISCUSSION

Background of the respondents: Table 1 shows the result from the questionnaire survey revealed that the Malay community formed the majority of Ipoh's respondent. Malay community formed the majority of sub-urban in Ipoh rather than Chinese at City centre. The Indians form the next two major races in Ipoh City.

The results also showed that most respondent in Ipoh City have the majority of its residents were fairly well educated. The majority of respondents were range of the ages from 18-60 years and above (Table 2). There were a total of 280 male and 254 female respondents. Majority of the respondents were in the ages of 18-25 years were total of 139 of the respondent. Table 3 shows the result of the educational structure of the respondents on the current survey suggests that the population in Ipoh City fairly well educated. About 80.5% of the respondents had at least primary education while those with secondary education accounted for 58.4% (Table 3). Another 18.5 acquired diplomas or degrees. Only 3.2 were illiterate.

From the 534 respondents, a total of 205 (38.4%) were own business. A total of 162 private sector (30.3%), 75 government staff (30.3%) and 92 others (17.3%) (Table 4). The majority of its residents were also found in the government staff, private sector and own business. This group represents a total knowing about Ipoh rapid development.

Table 1: Racial composition of Ipoh City in 2011

Race	No. of respondents	Percentage
Malay	330	61.8
Chinese	125	23.4
Indian	73	13.7
Others	6	1.1
Total	534	100.0

Fieldwork in 2011

Table 2: Age structure of respondents from 534 respondent in Ipoh City in 2011

Age structure	No. of respondents	Percentage
18-25	139	26.0
26-29	82	15.4
30-34	79	14.8
35-39	62	11.6
40-44	61	11.4
45-49	35	6.6
50-54	32	6.0
55-59	23	4.3
60 and Above	21	3.9
Total	534	100.0

Table 3: Educational structure of Ipoh City respondents

Jobs	No. of respondent	Percentage
No schooling	17	3.2
Primary school	32	6.0
Secondary school	312	58.4
Institute	74	13.9
University/higher education	99	18.5
Institute/profesional		18.5
Total	534	100.0

Table 4: Occupational structure of Ipoh City respondents

Occupational structure	No. of respondent	Percentage
Government sector	75	14.0
Private sector	162	30.3
Own bussiness	205	38.4
Others	92	17.3
Total	534	100.0

Human awareness of urban climate changes effect:

Table 5 shows that respondents were asked how are they aware the urban climate change and pollution in Ipoh. The results showed from a total of 534 respondents, 31.5% respondent strongly agreed and 55.2% respondent mentioned that a center of Ipoh urban City warmer than suburban Ipoh City (Table 5). Majority of respondents agreed Ipoh having rapid urbanisation bases on respondents response. One of the significant physical factors changes by human activities mentioned that vegetation areas having decrease due to development. All of the factors considered significant in contributing to urban climate changes effect, respondents in Ipoh City regarded urbanisation and pollution effect to be the most important factor (Table 5).

About 57.5% respondents agreed and 26.6% respondents strongly agreed were Ipoh population can lead to increasing congestion and effect to temperature increases. Another, 53.0% respondents agreed and 17.8% respondents strongly agreed that pollution caused by

cement and quarry industry in Ipoh as the most important factor. In addition, the respondents 46.4% agreed and 43.8% of respondents strongly agree that the current urban temperature is warming (Table 5). The result showed that all factors of urban climate changes awareness having high mean values. Overall, the result from this study has also shown that the majority of respondents in Ipoh are generally were aware about urban climate change and urban air pollution in Ipoh.

Human awareness of health in Ipoh: While the foregoing discussion has shown that a greater proportion of Ipoh's respondent show that their living environment as healthy condition (Table 6). The presence of cough was quoted by the highest number of residents (20.8%) as being an unhealthy aspect of their seft. A futher 36 residents (6.7%) considered their seft to have a asthma diseases.

The result from Table 6 show a significant of all the healthy aspects of their living environment, the majority of the residents (64.0%) still feeling good. Consequently, this shows that most residents in Ipoh agreed that their health to be free from urban climate effect although they need to renovate their houses. This was followed by another 20 resident (3.7%) who regarded their health effect as having-dry skin. Some respondents (16.0 respondents or 3.0%) were of the opinion that their living environment had bad breathless (Table 6).

Although, this was so, it does not necessarily mean it will lead to sore eyes diseases as only 9 respondents (1.7%) reported that their living environment was subjected to sore eyes diseases. On the whole, the generally low of the various unhealthy aspects mentioned showed that the effect of urban climate changes of most Ipoh respondents can be considered as reasonably healthy but they only need to do a renovation for their houses.

Human awareness to adapt urban climate change effect:

Table 7 shows the human awareness to adapt urban climate change effect in Ipoh. The most popular action taken by the respondents was that of should try to plant more plants in the green housing and dwelling. About 41.8% of the respondents reported that they agreed to modify the homes and buildings to improve the comfort and 10.9% of the respondents strongly agreed to plan to move to the suburbs. The 58.1% respondents agreed that they will try to plant more plants in the their house in Ipoh.

This was followed by 35.8% agreed to use car pool to work. The 58.8% respondents were using a alternative routes to avoid traffic congestion. In addition, respondents also indicated that they had to bear the medical cost increases (Table 7).

Table 5: Human awareness of urban climate change and pollution of Ipoh, Malaysia

Item factors considered	No. of respondent (%)						Mean	SD
	TM	STS	TS	KS	S	SS		
Weather condition in Ipoh urban center having more heat than suburban area	0.0	1.1	3.0	9.2	55.2	31.5	4.1	0.78
The urban climate change due to rapid development activities (urbanization)	0.0	0.7	2.2	6.9	60.1	30.0	4.2	0.70
Rapid urban development (urbanization) can lead to changes the urban atmosphere	0.0	0.6	1.3	7.9	57.7	32.6	4.2	0.68
Vegetation area having decreasing due to development	0.0	0.6	1.3	9.2	53.4	35.6	4.2	0.71
Surface of the earth has been covered with tarmac surface, the cement and asphalt that can store the heat	0.0	0.6	1.7	7.9	57.5	32.4	4.2	0.69
Many of mine areas that have been filled and closed (reclaimed) for residential, commercial and industrial sectors	0.0	1.1	2.4	13.5	54.5	28.1	4.0	0.82
Growing industrial areas that could increase pollution problems	0.2	0.7	1.3	6.9	54.5	36.3	4.2	0.72
Rapid traffic congestion occurs in Ipoh	0.2	0.4	1.7	5.6	47.0	45.1	4.3	0.72
Vehicles emissions cause air pollution in Ipoh	0.2	0.7	2.6	7.1	49.3	40.1	4.2	0.78
Cement industry and quarry caused dust problem in Ipoh	0.0	1.3	4.9	22.1	50.9	20.8	3.8	0.84
Air pollution caused by the cement industry and quarry industry	0.0	0.9	5.2	23.0	53.0	17.8	3.8	0.81
Ipoh population can lead to increasing congestion and effect to temperature increases	0.0	0.9	3.2	11.8	57.5	26.6	4.0	0.77
More frequent rainfall in the Ipoh City	0.0	2.4	11.4	37.3	38.4	10.5	3.4	0.91
The wind moves slowly in the center of Ipoh City than the suburbs	0.0	0.9	9.2	24.9	50.2	14.8	3.7	0.86
The car park at the center of Ipoh City is decreasing	0.0	0.7	3.7	18.2	51.3	26.0	3.9	0.81
Construction of buildings and housing increasing from Ipoh City center to the suburbs	0.0	0.7	3.6	11.4	55.4	28.8	4.0	0.78
More clouds and fog in the city center	0.0	5.2	12.5	41.9	31.6	8.6	3.2	0.96
Timber processing industry a source of air pollution in Ipoh	0.4	3.0	12.4	36.7	37.3	10.3	3.4	0.96
Outside temperature is hotter than in the home	0.0	1.7	3.9	17.0	48.5	28.8	3.9	0.88
Flash floods often occur in Ipoh	0.2	7.3	17.8	34.1	29.8	10.9	3.2	1.10
Total production of solid waste is increasing in Ipoh	0.0	0.4	3.4	11.2	52.8	32.2	4.1	0.77
Non sustainable land clearing which will destroy the aesthetic value	0.0	1.3	4.1	15.0	50.2	29.4	4.0	0.85
Do you have more information about urban temperature rise in radio, television, newspapers, magazines, internet and other	0.0	3.4	7.7	18.4	48.7	21.9	3.7	0.98
Environment in residential areas are not comfortable because there is little green vegetation and recreation areas	0.0	2.2	6.6	21.9	47.4	21.9	3.8	0.92
Green and recreational areas can reduce the temperature	0.2	1.7	2.2	6.9	52.1	36.9	4.2	0.80
Green spaces and recreation can avoid dust and noise pollution	0.2	0.9	3.9	10.3	54.7	30.0	4.1	0.82
Land clearing can increase the temperature of urban areas	0.2	0.9	4.5	10.9	55.1	28.5	4.1	0.83
The urban present temperature is hotter than ever	0.0	0.0	1.9	7.9	46.4	43.8	4.3	0.70
Urban areas increasingly crowded with buildings	0.0	0.2	3.0	7.7	45.7	43.4	4.3	0.75
The area around where I live has a lot of green vegetation	0.0	5.2	13.3	32.2	32.8	16.5	3.4	1.20

Table 6: Human awareness of the healthy aspects toward the urban climate changes

Unhealthy aspects	No. of respondent	Percentage
Asthma	36	6.7
Cough	111	20.8
Breathless	16	3.0
Dry skin	20	3.7
Sore eyes/watery eyes	9	1.7
No diseases	342	64.0
Total	534	100.0

Fieldwork in 2011

Table 7: Human awareness of adaptation toward Urban climate changes

Considered factors	Percentage age of respondent (%)					Mean	SD
	STS	TS	KS	S	SS		
I need to modify the home/building to improve the comfort	6.40	16.6	24.5	41.8	10.9	3.30	1.07
I plan to move to the suburbs	14.80	21.2	27.2	29.0	7.9	2.90	1.19
Should try to plant more plants in the their house	2.10	5.2	8.6	58.1	26.0	4.00	0.86
Use car pool to work	8.60	13.7	30.3	35.8	11.6	3.20	1.10
Use alternative roads to avoid traffic jams	1.50	4.9	12.4	58.8	22.5	3.90	0.82
Had to add the cost of medical-related illnesses	8.20	15.9	29.2	37.1	9.6	3.23	1.08

STS: Strongly disagreed; TS: not agreed; KS: not really agreed; S: agreed; SS: strongly agreed

CONCLUSION

This study concluded that the majority of the residents in Ipoh City are generally having significant awareness of urban climate changes and pollution. The majority of the respondents also agreed of all factors as the most important urban climate changes and pollution parameter constituting to health effect. Generally, it was also found that respondents in Ipoh City choose from a wide range of actions when they are faced with an urban environment problem. In Malaysia such studies contribute to the overall urban climate awareness of Ipoh residents in kinta valley and thereby foster a healthier outlook and care towards their urban environment and especially urban climate management. This will in turn ensure that the quality of the urban environment will not deteriorate in the future.

REFERENCES

- Chung, U., J. Choi and J.I. Yun, 2004. Urbanization effect on the observed change in mean monthly temperatures between 1951-1980 and 1971-2000 in Korea. *J. Climatic Change*, 66: 127-136.
- Fujibe, F., 1998. An increasing trend of extremely hot days in the inland of the kanto plain and its relation to urban effect. *Tenki J. Meteorol. Soc. Jpn.*, 45: 643-653.
- Hizam, M., 1993. Urbanization Impact on Air Pollution Concentration in Ipoh City, Undergraduate Exercise. National University of Malaysia, Bangi, Malaysia.
- Ibrahim, M.H., J.M. Jahi and A.S. Hadi, 2011. Trends of urban climatology changes in Ipoh City, Malaysia with special references on the temperature of urban areas. *Social Sci. J.*, 7: 535-538.
- Kato, H., 1996. A statistical method for separating urban effect trends from observed temperature data and its application to Japanese temperature records. *Japan. Prog. Climatol.*, 74: 135-149.
- Krejcie, R.V. and D.W. Morgan, 1970. Determining sample size for research activities. *Educ. Psychol. Meas.*, 30: 607-610.
- Normazidah, M.M., 1990. Urbanization, patterns of temperature and comfort terms and its implications in planning: A study in ipoh. Masters Thesis, National University of Malaysia, Bangi, Malaysia.
- Sham, S., 1982. *Town, City Climate and Air Pollution*. 2nd Edn., Dewan Bahasa dan Pustaka, Kuala Lumpur, Malaysia.