Malaysia Country Report 2010 (Wind Environment)

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ABSTRACT: This country report describes recent developments in the field of wind environment and air quality in the Malaysia It includes activities from several agencies and organization in Malaysia.

Keywords: wind environment

1. Introduction

This country report is being presented at the 6th Workshop on Regional Harmonization of Wind Loading and Wind Environmental Specifications in Asia-Pacific Economies (APECWW) in South Korea on October 21-25, 2010. It describes recent developments in the field of wind environment in the Malaysia.

In the wind environmental aspects, monitoring is focussed only ambient air quality. Physical aspects on wind movements within structures are of not paramount important as most of the country blessed with the mild monsoon winds apart from naturally sheltered by the geographical settings. Precautionary and mitigate measures on possibility of risks to wind-related disasters are always main factors in planning, designing and recapping of existing facilities. This report highlights some relevant aspect of wind environmental in Malaysia.

2. Relevant local laws and regulations

Environmental management in Malaysia become more focussed with the gazzettement of the Environmental Quality Act (EQA) on 14 March 1974. From thereon, an enforcement agency named Environment Division (known as Department of Environment (DOE) in 1983) was institutionalised in 1975. The Department's main role is to prevent, control and abate pollution through the enforcement of the **ACT 127 ENVIRONMENTAL QUALITY ACT 1974 (EQA 1974)** and its 34 subsidiary legislation made there under. As air quality is concerned, the relevant provision was stated under **Section 22 Restrictions on pollution of the atmosphere, EQA 1974.**

Malaysia Government shows strong commitment in environmental issue with set up the National Policy on The Environment 2002. This policy statement sets out the principles and strategies necessary to ensure that the environment remains productive, both ecologically and economically (NPTE, 2002).

There is legislation made, among others, **Environmental Quality (Control of Emission from Motorcycles) Regulation 2003. Environmental Quality (Control Of Petrol And Diesel Properties) Regulations 2007, Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987** *latest amendments* **- *P.U.(A) 489/2000,* Environmental Quality (Prohibition On The Use Of Chlorofluorocarbons And Other Gases As Propellants And Blowing Agents) Order 1993, Environmental Quality (Compounding Of Offences) (Open Burning) Rules 2000, Environmental Quality (Clean Air) Regulations 1978** *Latest Amendments* **- *P.U.(A) 309/2000,* Environmental Quality (Control Of Lead Concentration In Motor Gasoline) Regulations 1985, Environmental Quality (Control Of Emission From Diesel Engines) Regulations 1996,** *latest amendments* **- *P.U.(A) 488/2000,* Environmental Quality (Control Of Emission From Petrol Engines) Regulations 1996, and Environmental Quality (Control Of Petrol And Diesel Properties) Regulations 2007.**

There are no specific codes and standards, or laws and regulations in Malaysia on pedestrian-level comfort criteria, as would apply to the wind environment in zones or clusters of structures.

3. Air Quality Monitoring

The DOE monitors the country's ambient air quality through a network of 51 continuous monitoring stations. These monitoring stations are strategically located in residential, urban and industrial areas to detect any significant change in the air quality which may be harmful to human health and the environment. The air quality status is reported in terms of Air Pollutant Index (API) (http://www.doe.gov.my).

The air quality in Malaysia is described in terms of Air Pollutant Index (API). The API is an indicator of air quality and was developed based on scientific assessment to indicate in an easily understood manner, the presence of pollutants and its impact on health. The API system of Malaysia closely follows the Pollutant Standard Index (PSI) developed by the United States Environmental Protection Agency (US-EPA).

The air pollutant index scale and terms used in describing the air quality levels are as follows:

API scale	Air quality
0 – 50	Good
51 – 100	Moderate
101 – 200	Unhealthy
201 – 300	Very unhealthy
301 and above	Hazardous

The air pollutants used in computing the API are ozone (O_1), carbon monoxide (CO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and particulate matter of less than 10 microns in size (PM_{10}).

Recently DOE produced and published on-line API daily index at http://www.doe.gov.my/apims/

4. Wind Environment Evaluation

Kubota and Supian, (2006), presents the evaluations of the wind environment in selected case study areas, under the respective climatic conditions in major Malaysian towns. The study aims to promote natural ventilation within dwellings, as part of an effort to reduce energy consumption of air-conditioners at the neighbourhood scale. The study discusses planning methods of neighbourhood residential areas in Malaysia, focusing on the effect of wind flow.

Malaysia consists of the Peninsular Malaysia and a part of Borneo Island. Since the Peninsular has the major population (76%), the study is focus on this area. The Peninsular Malaysia is situated between 1°N and 7°N latitude, under the tropical climate. Most towns in the Peninsular experience high temperature and humidity throughout the year without remarkable variations. However, there is a seasonal climatic change, which is dominated by the monsoons. The monsoons represent significant changes in the wind conditions and rainfalls. The monsoon season can be divided into two monsoon periods and the inter monsoon period; namely, the northeast monsoon period (November to March), the southwest monsoon period (May to September) and the inter monsoon period (April and October).

Most Malaysian towns experience relatively weak wind as well as hot and humid climate throughout the year. Thus, major problems induced by the wind in Malaysian towns are considered as outdoor thermal discomfort and the lack of natural ventilation in buildings due to insufficient wind speed. In addition, neighbourhood areas where the wind velocity is usually reduced by the effects of building density. Therefore, the above criteria were applied for the evaluations of wind environment.

The evaluations in towns on the west coast and inland of Peninsular Malaysia showed results that, the majority of terraced house cases did not meet the required criteria, under the respective local climatic conditions. This was mainly due to the weak wind conditions in these towns. It was considered that the location of towns was a key factor in determining such weak wind conditions. High-rise housing was suggested as an effective means of utilizing stronger winds at elevated floor levels in urban Malaysia.

5. Recent Research:

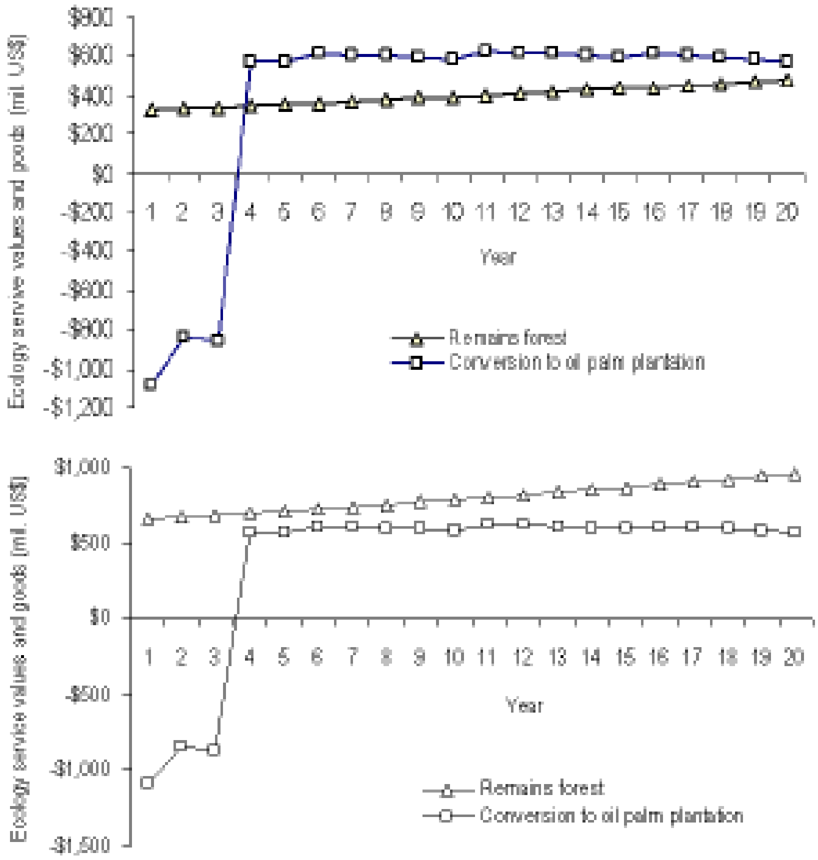
Joint collaborative research with universities and related agencies in deriving environmental satellite index (ESI) for input into the Environmental Protection Index (EPI). As the government is very committed in ensuring the country and all cities within the liveable range, efforts at respective agencies are taken to assist targeted EPI rank is achieved. Three ESI are recently being developed as follows:

1) Ambient air quality monitoring (AQM) using aerosol depth derived from MODIS of Terra/ Meris Satellites. The resultant output is long term (2001-2006) exposure of PM2.5, PM10 and NO2 that are above threshold of WHO and hazardous to health. The long term model developed for measured AOD can now readily be used for daily monitoring, as in accordance to daily and long term threshold of man-exposure to air pollutants (PM2.5, PM10, NO2).

2) Coastal Water Quality Indicator (CWQI) using chlorophyll a derived from MODIS and ocean colour radiometers of Aqua and SEAWIFS satellites, respectively. The long term satellite data, acquired daily from 1998 to 2009 were processed with in-situ calibration, where final chlorophyll-a are derived. Spatiotemporal analysis with landscapes changes within coastal areas are performed, reporting the degree of landscape changes (vegetative cover) with the content of chlorophyll a distribution. Developed model can be used for daily monitoring of landscape changes to indicate coastal water quality which have direct impact to fisheries industry.

3) Biomass Burning Monitoring using derived burnt areas from MODIS of Terra / Aqua satellites, respectively. The burnt areas due to wild fires within the country peat forests and drained-peat cultivated areas has been main contributor to degradation of the environmental in particular to air and forest cover. Efforts are now being studied to study to quantify the biomass burning of the burnt area and the related emissions. The findings are to be fed into mitigate measures should such burning occurrence in the future.

We have recently completed the research on Risk Assessment Mapping of Landscape Development Based on Ecological Service and Goods (ESVG) in Malaysia Lowland Tropical Rainforest (Hashim et al, 2010). In this study the risk of landscape development in term of the ecological services and goods have been devised. Relationship in the term of economical return on such development and preservations, and thoughts on how the paramount pressures are faced by the government and policy makers to balance the development and the environment apart from ensuring resources for sustainable rural incomes. This study shows (see Fig 1) that about 1464 ha (about 0.2% of PFR) of primary forest have been converted to agricultural activities which have significantly increased the erosion rate with maximum value of soil loss of 69 million ton/ha/yr. Further, the mean rate of soil loss for PFR is 0.8 mil ton/ha/yr which caused lost of US$ 4.8 mil/yr in the ESVG degradation. Indeed, majority of the resultant soil loss within all land use classes are within range of very low - low risk categories (<10 ton/ha/yr). ESVG for PFR are costing US$ 179 mil in 1995, declined to US$ 114 mil in 2003 due to 0.2% reduction of forested land. In fact, the annual asset of converting 339,630 ha primary forest into mass plantation determined from ESVG cost less than original forest within period of 20 years examined, i.e., at 20th year of conversion, the plantation and original forest cost US$ 963 and US$ 575 millions, respectively. However realistic parameters and compromising values of ESVG used in PFR has yet to be acceptable against stakeholders as well as sound to the policy makers as we anticipated such rapid assess of proposed landscape development only for modeling per se but it implementation is of practical for future sustainable landscape development.



Source: Hashim et al., 2010

Fig 1: Annual assets of keeping primary forest (339,630ha) intact versus converting it into mass oil palm plantation using: (a) 11 parameters of ecology service values and goods, and (b) the entire 17 recommended parameters of ecology service values and goods.

6. Acknowledgment

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7. References

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