Article

EXCHANGING HEALTH FOR ECONOMIC GROWTH?: HAZE IN THE CONTEXT OF PUBLIC HEALTH AND POLITICAL ECONOMY IN MALAYSIA

Helena Varkkey[1] and Alison Copeland[2]

Abstract: Many low- and middle-income countries in particular suffer from bad air quality. The countries of Southeast Asia, which for decades now have experienced a particular type of severe toxic air pollution almost annually called "haze", are a pertinent example of this trend. The most recent serious episode of haze was in September 2019. The regional haze pollution has close links to the region's political economy, particularly the burgeoning agribusiness sector. This paper argues that the importance of the agribusiness sector to the region has influenced how national governments have chosen to respond to haze pollution events, particularly and most critically, how these events affect the health of their populations. Malaysia was chosen as a case study as Malaysia is both actively involved in the region's agribusiness sector and is also severely affected by haze pollution. In this context, the paper shows how, to downplay the effects of haze on health, the health interventions put into place by the Malaysian government has been lackadaisical and lacking both urgency and accuracy. As a result, while haze negatively affects the health of the Malaysian population across the board, we argue that it will also likely cause geographical variations in health, particularly between the urban and rural populations. This paper adopts a collective political economy explanation to argue that political choices in line with the interests of the economically significant and thus powerful agribusiness sector have marginalised the health of large swathes of the Malaysian population. Furthermore, we argue that this marginalisation has been subconsciously accepted by the general population due to the ideological importance of this sector to the developmental trajectory of the nation. In this way, environmental degradation, and in turn deteriorating health, is often seen as an acceptable trade-off for economic growth. Unfortunately, particularly marginalised sections of the society (the less educated, rural poor) would tend to suffer the most in terms of health outcomes.

INTRODUCTION

The Constitution of the World Health Organization (WHO), adopted in 1946, states that "the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition". However, many individuals are still unable to enjoy a good standard of health today. One vital area of concern is the poor health caused by exposure to unhealthy air.

[1]University of Malaya
2Newcastle University

Correspondence may be sent to Helena Varkkey via email at helenav@um.edu.my

Air pollution is increasing the risk of respiratory diseases, strokes, lung cancer, heart disease, and other serious health problems in populations all around the world. At the international level, key bodies of the United Nations have started to acknowledge the urgent need to address the challenges posed by air pollution to humans and the environment. In June 2014, The United Nations Environment Assembly under the UNEP adopted a resolution on air quality at its very first session. The resolution noted that "poor air quality is a growing challenge in the context of sustainable development, in particular relating to health in cities and urban areas" (Lode & Toussaint, 2016).
Many low- and middle-income countries in particular suffer from bad air quality (Lode & Toussaint, 2016). The countries of Southeast Asia, which for decades now have experienced a particular type of severe toxic air pollution almost annually called "haze", are a pertinent example of this trend. At its worst, the haze can travel to reach six Southeast Asian nations. Indonesia, Malaysia and Singapore, among the largest economies of the region, suffer the brunt of haze almost every year. The most recent serious episode of haze was in September 2019. The haze has caused affected governments to declare repeated emergencies at worst hit areas, closing schools for days on end and restricting outdoor activities.

It is notable that the WHO conceptualisation of health as a fundamental human right makes reference that this right should be obtainable to all regardless of politics, economics and social condition (World Health Organization, 1948). This is because the regional haze pollution has close links to the region's political economy, particularly the burgeoning agribusiness sector. This paper argues that the importance of the agribusiness sector to the region has influenced how national governments have chosen to respond to haze pollution events, particularly and most critically, how these events affect the health of their populations.

The states most severely affected by haze pollution in the Southeast Asian region are Indonesia, Malaysia and Singapore. Malaysia was chosen as a case study as Malaysia is both actively involved in the region's agribusiness sector and is also severely affected by haze pollution. In this context, the paper shows how, to downplay the effects of haze on health, the health interventions put into place by the Malaysian government has been lackadaisical and lacking both urgency and accuracy. As a result, while haze negatively affects the health of the Malaysian population across the board, we argue that it will also likely cause geographical variations in health, particularly between the urban and rural populations.

Research Methodology

This paper adopts a collective political economy explanation to argue that political choices in line with the interests of the economically significant and thus powerful agribusiness sector have marginalised the health of large swathes of the Malaysian population. Furthermore, we argue that this marginalisation has been subconsciously accepted by the general population due to the ideological importance of this sector to the developmental trajectory of the nation. In this way, environmental degradation, and in turn deteriorating health, is often seen as an acceptable trade-off for economic growth. Unfortunately, particularly marginalised sections of the society (the less educated, rural poor) would tend to suffer the most in terms of health outcomes.

The results and findings of this paper are obtained through a thorough process of document content analysis triangulated with other primary and secondary data. Local newspaper articles were important primary sources for this paper. Haze being an issue that is of great concern to the Malaysian public, progress on the subject is closely followed and reported in the local media, making it an invaluable source of information for this paper. These findings were corroborated with Malaysian government and ASEAN documents, reports and websites, think tank and other organizational reports, foreign news articles, as well as academic articles and books on this subject. However, owing to the difficulty of doing empirical research on such a sensitive topic, there are certain points that unavoidably have to be reliant on a single source of data alone.

Compositional, Contextual, and Collective Explanations

Macintyre et al. (2002) has suggested three types of explanations for geographical variations in health: compositional, contextual, and collective. Compositional and contextual explanations are considered more "traditional" explanations in the literature. Compositional explanations are the makeup of individuals concentrated in particular places such as their individual socioeconomic status (including housing and employment), income, co-morbidities etc, while contextual explanations cover the broader context of where they live, such as the availability of services, the environment, local climate etc.

Over time, it has become accepted that there are also collective explanations to health variations, which give importance to shared norms, traditions, values, and interests (Macintyre et al., 2002). This perspective gave an important anthropological perspective to the socioeconomic, psychological, and epidemiological perspectives (as

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explained above) often used to examine area effects on health. These collective explanations include "shared, social functioning such as ethnic, regional or national identity, religious affiliation, political ideologies and practices, legal and fiscal systems, shared histories, kinship systems, domestic division of labour, gender, age and caste appropriate roles" (Macintyre et al., 2002).

Under this collective explanation, the political economy of an area or country is an important anthropological perspective to understand geographical variations to health. This approach focuses on the social, political and economic structures and relations that may be, and often are, outside the control of the individuals or the local areas they affect (Krieger, 2001). Why some places and people are consistently privileged whilst others are consistently marginalised is a political choice – it is about where the power lies and, in whose interests, that power is exercised. Political choices can thereby be seen as the causes of geographical inequalities in health (Bambra, 2016).

In a neoliberal society, the provision of care by governments is increasingly influenced by the political economy. As Bambra and Fox (2007) explain, a strong economy is seen as essential, and as such, the amount of health care provided is set within these boundaries. As such, people's health is exchanged for economic growth to a certain extent. We argue that the 'haze' in Malaysia is a classic example of balancing the healthcare needs of the local population with the larger political economy landscape.

"Haze" or Toxic Smoke?

An early indicator of how the severity and danger of the haze has been downplayed in Malaysia and in Southeast Asia more broadly is in the usage of the term "haze" itself. The word haze, adopted unanimously by states in the region at the ASEAN level, has been recognised to be euphemistic and thus inappropriate for describing such a man-made problem. Within the ASEAN context, it refers to "sufficient smoke, dust, moisture, and vapour suspended in air to impair visibility". However semantically, the term normally denotes a naturally occurring climatic condition in which visibility is affected, for example "heat haze" (Oxford University Press, 2019).

A more appropriate term, which is being used in several circles is "toxic smoke". This is due to the particular types of organic and inorganic material present in this smoke. Studies have found that the particles that make up the haze include inorganic materials such as black carbon, potassium (K+), chloride (Cl-), sulphate (SO42-), zinc (Zn), and silicon (Si) and organic materials such as dicarboxylic acids (DCAs) and dicarboxylate salts (DCS), tracer compounds (e.g. methylhalides, K, levoglucosan, and acetone), monosaccharide anhydrides (MAs) (e.g. asosan, mannosan, and galactosan) and the highly carcinogenic polycyclic aromatic hydrocarbon (PAH) (ASM Haze Task Force, 2018).

These minute particles found in the haze can be as small as 2.5μ or less (identified as particulate matter or "PM" 2.5). While larger particles can be filtered out by microphages, these smaller particles can easily penetrate lung tissue of those exposed to the haze, settle deep in the lungs, and interfere with lung function after long exposure (Amul, 2013). They can also enter cells passively. Temporal exposure to high concentrations of PM2.5 increases the risk of myocardial infarction after a few hours in high-risk populations, and PM2.5 was found to have a direct correlation with the upper respiratory tract infections during haze periods. PM2.5 has also been found to have effects on all-cause, cardiopulmonary, and lung cancer mortality (How & Ling, 2006). The World Health Organization (WHO) in fact warned in 2012 that exposure to these minute particles can trigger a chronic symptomless heart disease called atherosclerosis, adverse birth outcomes, and childhood respiratory diseases. The elderly above 65 years was the group of people suffered the most, health-wise (Nazeer and Furuoka, 2017), followed by very young children (Nazeer & Furuoka, 2017). Furthermore, the reduced attractiveness of physical outdoor activity due to uninviting outside conditions also reduces the ability of people, especially those with existing respiratory infections or cardiovascular conditions, to maintain a healthy lifestyle (Amul, 2013).

Researchers have been able to confirm that the inorganic and organic particles in the smoke is highly consistent with those of plant biomass materials which have been burned and have been further able to identify the characteristics of the ecosystems from where these biomass materials originate. While there are many types of forest fires that can occur in Southeast Asia, it was found that most of the transboundary haze in the region (conservative estimates suggest 60%, while others say up to 90%) is attributable to fires on peatlands (Heil, 2016). Peatland fires constitute only around 40% of forest fires in Southeast Asia (ASM Haze Task Force, 2018), however the partial combustion from peat fires produce more smoke and the particles released from these fires takes longer to settle. This allows the particles to float through the air and drift with the wind to cross national boundaries.

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Haze-Producing Agricultural Practises on Peatlands

In Southeast Asia, peatlands generally occur along coasts and in terrestrial conditions on low-lying, poorly drained sites, and are identifiable for their waterlogged, fluctuating water table conditions that gives it a characteristic 'blackwater' appearance. Natural peatswamp forests are also important water catchment and control systems, helping to reduce flood peaks and provide water in dry periods. Coastal peatswamps are also a buffer between marine and freshwater systems, preventing excessive saline intrusion into coastal lands and protecting off-shore fisheries from on-shore pollution (Phillips, 1998). Tropical peatlands are also important carbon sinks or reservoirs, as carbon is stored in the peat that is formed from organic material like tree and other vegetation litter, organic soil and sediments which have been built up over thousands of years (Lo & Parish, 2011).

Large-scale development of Indonesian peatlands started in the 1960s as a result of population and land pressure for agriculture. Peat soil is acidic, low in inorganic ions and oxygen, high in carbon, and has high concentrations of humic acid (Phillips, 1998). These are very infertile conditions and is unsuitable for most crops. However, the burgeoning need for land brought about by the oil palm boom in countries like Indonesia has encouraged the conversion of peatlands to plantations. Despite its unsuitability for other crops, peatlands are quite suitable for the growth of oil palm when deeply drained. Research has shown that oil palm has a high tolerance for areas with fluctuating water tables, and oil palm grown on reclaimed peatsoil has a particularly high fruit production. While the constraints discussed above make oil palm development on peat soil more expensive (with costs on peatlands almost double as compared to set up costs on regular mineral soil), higher oil palm trading prices have made this economically viable (Varkkey, 2016).

Problems arise during draining and preparation operations (Basiron, 2007). Once valuable timber is removed to be sold, the peat is usually burned to remove any remaining vegetation (Stone, 2007), either by the company directly or by using sub-contractors. Burning peatlands is a fast way to clear unwanted weeds and grass in preparation for planting and reduces the risk of pests. Furthermore, using machinery is problematic and expensive on the soft peatlands, with the soggy soil hindering the use of bulldozers. Clearing land mechanically on peatlands costs an average of around US$ 250 per hectare. Clearance by fire could cost a mere US$ 5. Burning (specifically the ash that it produces) also saves on the cost of the expensive alkaline fertilizer; which is otherwise required to increase the acidity of peatlands to levels that are suited to oil palm growth (Zakaria, Theile, & Khaimur, 2007).

Even for the companies that do not deliberately use fire, disturbance to the naturally waterlogged condition in peatlands create extremely dry conditions and hotspots. Once the peatswamp water table drops from draining, it dries very quickly, making it naturally fire-prone. Drastic land conversion like this further degrades and dries out the natural landscape in such a way that future hotspots and accidental fires are liable to occur again and are likely to be more severe (Raman, Van Schaik, Richter, & De Clerck, 2008). Fires on peatlands, are extremely hard to put out. This is because the fires often extend underground are not visible to the naked eye. Therefore, conventional methods of fire-fighting and regular dousing is inadequate and often extensive flooding of vast areas of peat is needed (Varkkey, 2016).

The sensitive nature and ecological importance of peatlands justified special legislation restricting development on peatlands, like the Presidential Decree No. 32/1990, Indonesian Government Regulation No. 26/2008, Regulation of the Ministry of Agriculture No. 14/2009, and Ministry of Agriculture Instruction to the Governors of Indonesia No. 301/TU.210/M/12/2001 (13 December 2007). Essentially, this means that issuing of plantation concessions on peatlands across Indonesia is wholly forbidden. And most recently in 2019, President Joko Widodo announced that a long-running moratorium on all new land clearing on peatlands has been made permanent (Jong, 2019). Hence, Indonesia actually has very clear policies on the use of peatsoil which, if properly observed, should lead to the sustainable management of peatlands. However, despite this, research has shown that, up to 25% of concessionaires deviate from this rule and plant on peat anyway. All these plantation lands and future plantations on peat are essentially 'illegal' because it contravenes national laws and policies. However, these laws are rarely enforced, and these companies are very rarely prosecuted (Varkkey, 2016).

Complicit Malaysian Plantations in Indonesia

A significant number of these concessionaires complicit in these activities have been found to have Malaysian linkages. When the government of Indonesia opened up the oil palm sector to foreign investors during the early 1990s (McCarthy & Cramb, 2009), a trend quickly developed within the sector where regional investors in the sector overwhelmingly outnumbered investors from other countries. Malaysian plantation interests, who were already well-established in their home country but was faced with dwindling availability of arable land for new plantings there (a country that is comparatively much smaller and less-forested than Indonesia), led the pack (Marinova, 1999).

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The Malaysian government was highly involved in facilitating the regionalization of major Malaysian plantation companies. For example, the Malaysian government was successful in concluding a bilateral investment treaty with Indonesia in 1997, where the Indonesian government pledged to specially allocate 1.5 million hectares of land to Malaysian developers for oil palm development (Casson, 2002). These lands were preferentially given to companies with close relationships with the government. Currently, Malaysian investments hold more than two-thirds of Indonesia's total oil palm plantation area. It is estimated that there are 162 plantations having linkages to Malaysian companies (Varkkey, 2016).

Since then, there has been increased evidence of the link between illegal peat and forest fires in commercial oil palm plantations, especially Malaysian plantations. A list provided by the Indonesian government in 1997 identified the top 35 smoke-emitting plantations in Indonesia as of Malaysian origin. For example, a report by Greenpeace detailed 234 hotspots on five of IOI's Indonesian concessions between 2006 and 2007 (Greenpeace, 2007). Milieudefensie, another NGO, found that newly opened plantations in West Kalimantan belonging to IOI in 2009 had a substantial increase in fire hotspots in newly cleared land (Varkkey, 2016). One especially high-profile case is that of a subsidiary of the Malaysian plantation company KLK, PT Adei Plantation and Industry (PT API), which was found guilty for illegal burning under the Indonesian Environmental Management Act 1997 in 2001 (Saharjo, Danny, Moore, & Simorangkir, 2003).

The Malaysian government however has generally attempted to downplay the role of Malaysian companies in the situation. For example, Malaysian official figures often grossly underestimate the amount of land owned by Malaysian investments in Indonesia, to give the impression that their contribution to the haze could not be that drastic. Frequent reports by Indonesian authorities and NGOs of Malaysian companies suspected of burning are often quickly dismissed and denied by Malaysian authorities (New Straits Times, 2006), citing lack of evidence from the Indonesian authorities (Hajramurni & Sangadji, 2006).

Generally, the Malaysian government either does not take any harsh action upon guilty firms or denies all allegation of guilt coming from the Indonesians. Complementing this, the Malaysian Palm Oil Council continually insists that 'zero-burning is strictly enforced', 'forests are not converted for oil palm expansion' and that Environmental Impact Assessment (Analisis Mengenai Dampak Lingkungan or AMDAL) studies 'ensure wise development' (Raman et al., 2008) in all Malaysian owned plantations, including those in Indonesia.

More recently, the Malaysian-owned Genting Group, via its subsidiary PT Globalindo Agung Lestari, was found to be among ten companies listed as having the largest burned areas on their land in Indonesia (Greenpeace Malaysia, 2019). And in the recent 2019 haze episode, four Malaysian companies were among the 30 companies whose concessions had been sealed off by Indonesian authorities as fires had been spotted on their land (The Star, 2019c). While the new Malaysian Minister of Environment, Science, Technology and Climate Change insisted that Malaysian companies complicit in fires and haze should be prosecuted in accordance with Indonesian law, a conflicting response was heard from the Minister of Primary Industries, who said that this open linking of haze to palm oil was not a wise move as it was "playing right into the hands of anti-palm oil campaigners" (Povera, 2019).

Downplaying of Health Effects and Interventions

Despite the overwhelming evidence that the haze was seriously threatening the health and wellbeing of Malaysian citizens, and that Malaysian companies are directly contributing towards the transboundary haze crisis that continues to plague its home country, the Malaysian government reacted to the crisis by downplaying the severe effect of haze on human health.

For example, during one of the first appearances of transboundary haze in 1982, the Minister of Science, Technology, and the Environment frequently declared that haze particles were not hazardous to health, as they were not active and non-toxic. Even after the Health Ministry acknowledged the increase of haze-related diseases, public health advisories frequently advised the public to merely 'not breathe too vigorously' while outdoors (Varkkey, 2016).

The Malaysian Education Ministry also barred academic researchers from talking to the media on "sensitive issues", in reference to the haze. For example, an academic from Universiti Putra Malaysia that was interviewed lamented that "the government banned my research! Dr Mahathir [the Prime Minister at the time – and once again today] was not happy with it, so they did not let me circulate it ... because they did not want the public to find out how bad the haze was for their health" (Varkkey, 2016). In line with the government, the Malaysian press was also careful not to use more serious sounding lexicons to describe haze, like "smog" or "air pollution" (McLellan, 2001).

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Furthermore in June 1999, following public concern due to lack of clarity about the haze and its potential dangers, the Malaysian Cabinet used the Official Secrets Act 1972 (allowing them to mark any document "secret" for an unspecified period) to withhold the dissemination of daily Air Pollution Index updates to the public, as it "did not want irresponsible parties to take advantage of the situation and exaggerate conditions" (Article 19 & Centre for International Journalism, 2007). The API figures were declassified only in 2005. Therefore, for six years, the Malaysian public did not have any reliable way to judge if they were safe breathing the outdoor air.

Even after the API figures were declassified, there remained the issue of the parameters used to report these figures. Malaysia originally only measured larger particles of PM10 (10μ) in size. However, scientists have raised concerns that PM10 measurements do not accurately reflect air quality, especially during haze periods. The WHO had in fact already warned that the health effects of PM2.5 are more adverse than PM10 (Caballero-anthony & Tian, 2015). For this reason, PM2.5 is the more critical pollutant that should be measured (How & Ling, 2006).

When a member of the opposition raised this issue in 2015 after he returned from a visit to Singapore and observed the stark differences in air quality ratings (Singapore had been using PM2.5 for some time already), Malaysia's Deputy Minister of Natural Resources and the Environment absurdly responded that "for Malaysia, our API is more sensitive to health effects while Singapore's is more targeted towards outside activities, so if their API reading is 120 or 150, they would possibly tell their people not to participate in outdoor activities, but ours is pegged to health, that is why we use the international protocol" (Chen, 2015). This statement was erroneous, as both PM10 and PM2.5 are health measures, with PM2.5 being the far superior measure, because the smaller pollution particles can reach down in to the small airways, causing more damage.

Most recently, in 2016, a highly publicized study by scholars from Cambridge, Columbia, and Harvard universities (Koplitz et al., 2016) estimated that the serious regional haze in 2015 resulted in 100,300 excess deaths across Indonesia, Malaysia, and Singapore. This was estimated to be more than double the excess deaths caused by the 2006 event. For Malaysia in particular, the study reported an additional 6,500 deaths. The study used the adjoint of the CEOS-Chem chemical transport model to estimate population-weighted smoke exposure, which enabled the researchers to measure consequent morbidity and premature mortality due to severe haze.

The news reports prompted swift (and stern) responses from regional governments, including Malaysia. The Malaysian Health Ministry straight out denied that there were any fatalities that had occurred as a result of haze. The ministry in fact maintained that, apart from irritable symptoms, no grave health risks were likely as a result of haze. It insisted that it did not find any increase in the number of acute respiratory ailments from the haze, nor any increase in the number of cardiac or respiratory deaths before, during, or after the haze period. The government simply ignored the explanation given by the scholars that their figures do not just account for deaths from acute smoke inhalation, but also increases in strokes, heart attacks, and other illnesses that can be brought on by excessive exposure to PM2.5 particles (Varkkey, 2019). Arguably, this paints a more accurate picture of mortality than the somewhat simplistic (eg. haze listed as cause of death) parameters used by the country.

Despite the change of government for the first time since Malaysia's independence in 2018, the 'new Malaysia' again saw familiar patterns of downplaying both the severity of the haze effects on health and health interventions taken by the government when the haze returned in 2019. Even though this year finally saw the incorporation and use of PM2.5 in API reporting, these figures were still reported on a 24-hour average basis, and not the more accurate and time-sensitive hourly basis as has been done in Singapore. This averaging out of the ratings have been used by the DOE in the past to counter public queries about the mismatch between visibility and API: "readings could be moderate but visibility poor because API readings represented an average" (Chen, 2015). Furthermore, the Health Minister also denied any extraordinary increase in the number of haze-related illnesses during this episode (Bernama, 2019a).

In terms of interventions, this year the government sent 500,000 face masks to hard-hit areas in Sarawak to be distributed to the locals (The Star, 2019a). However, these masks were the regular surgical masks, generally understood as not being able to filter out haze particles, instead of N95 face masks which are able to filter out at least 95% of airborne particles larger than 0.3μ, including PM2.5. The issue of a lack of supply of these N95 masks, with many places being sold out and prices hiking, has also yet to be resolved even though masks were supposed to be controlled items. And while the Ministry of Education announced that schools could close at their own discretion once the API reaches 200 without waiting for a Ministry directive, the government announced that an emergency would only be declared once the API reaches 500[1] – far above hazardous levels (The Star, 2019b).

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Geographical Variations of Health Outcomes

The National Haze Action Plan published by the National Disaster Management Agency under the Prime Minister's Office offer public health advice and directives that are very general, roughly following the API guidelines. Action on the ground is meant to be instigated along these guidelines (See Image 1). Further general do's and don'ts have been released by the Department of the Environment, which include avoiding open burning, putting out and reporting small fires, getting treatment at clinics/hospitals when necessary, staying indoors, reducing intense sports activities, drinking lots of water, and driving with headlights switched on (See Image 2).

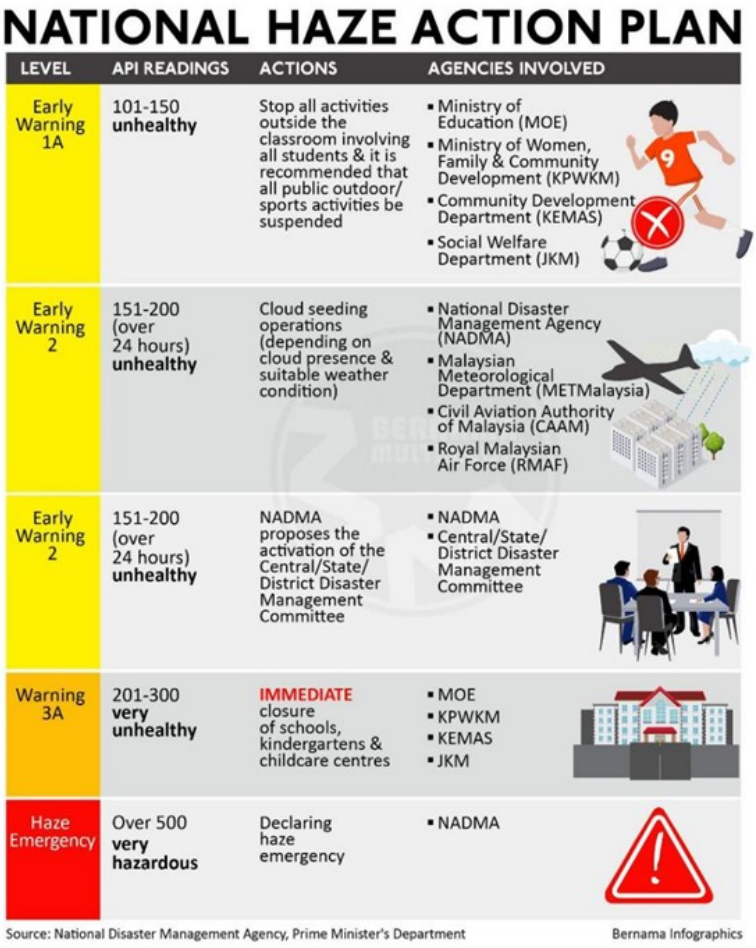

Image 1: National Haze Action Plan

[1]If the API reaches levels over 500, a haze emergency should be declared and towns should be evacuated Yet, even though this figure was previously breached in Sarawak, evacuation never occurred due to logistical challenges (Eaton & Radojevic, 2001)

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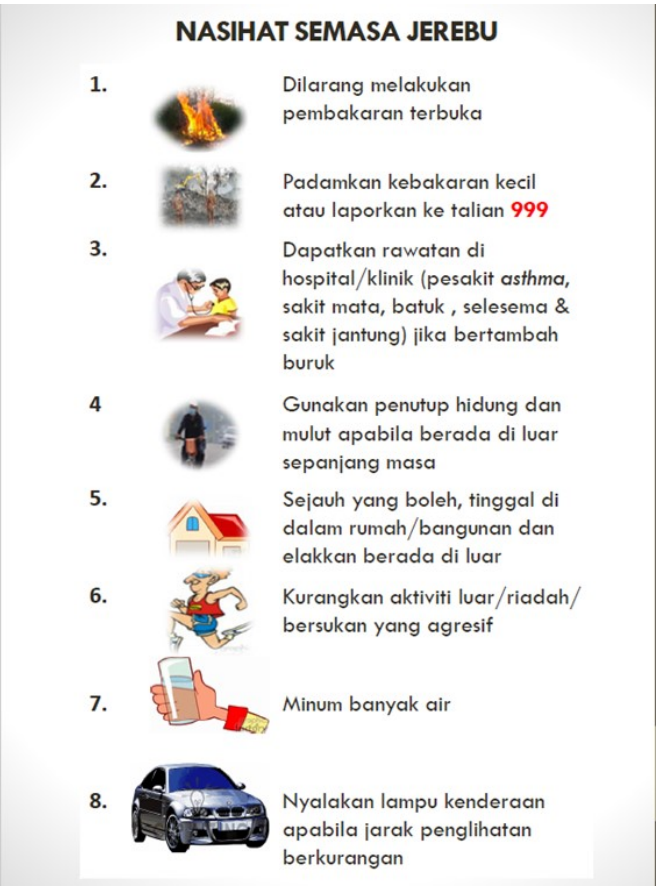

Image 2: Department of Environment advisory during the haze.

The advice given is general to the whole population with no distinction between different income brackets or urban and rural areas, thus ignoring the specific needs of poorer, rural populations. While the more urban, upper- and middle-class of society can likely educate themselves independently on the health risks of haze, afford medical treatment, or instigate preventive measures themselves, perhaps even leaving the country for greener pastures on the worst days, the consequences of treating the haze as a non-public health issue is likely highest and most severe among at-risk, poorer populations in these countries, due to their lower morbidity levels leading to greater susceptibility to ill health (Mariapun, Hairi, & Ng, 2016). We argue that this would be especially so for those living in rural areas.

Firstly, most of the advice focuses on schoolchildren. Keeping schoolchildren indoors may be an effective strategy in urban areas, especially among the upper- and middle-class, whose often concrete, self-contained homes are equipped with airtight windows, air conditioning and sometimes even air purifiers. However, in rural areas, the majority of homes are made of wood, with traditional natural wooden louvre window ventilation systems that are designed to allow in a continuous flow of air (Hassan, Zin, Majid, Balubaid, & Hainin, 2020). This is an effective way in the tropics to combat the year-round heat, however this presents a serious structural limitation on the effectiveness of the "stay indoors" advisory. Hence, there is generally not a significant difference of exposure to haze among rural children whether they are at school or at home.

The strategy of focusing on schoolchildren was chosen as it was hoped to have a knock-on effect on the exposure of the broader population to haze as well. When children are forced to stay home from school, it is likely that parents or caregivers would have to stay home as well to take care of them (personal communication with policymakers). This was hoped to keep more of the population indoors, while indirectly reducing the number of cars on the

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roads which contribute to baseline pollution. While this may be true in cases where caregivers have regular office jobs where sick leave or annual leave can be afforded for this purpose, this is often not the case in rural areas.

In rural areas in Malaysia, due to distance from financial centres and general lower level of education, employment is more commonly on a casual basis or under self-employment. Rural populations tend to be reliant on agriculture, as their primary source of income, thus spending much more time outdoors, unable to escape to the relative safety of air-conditioned offices during haze episodes.

This is especially so for the significant number of the rural population working directly on oil palm plantations, which is also a major sector in Malaysia. Here, harvesting occurs at least every two weeks. Whilst large corporations may be able to absorb financial losses by suspending harvesting (The Star, 2015), smallholders, who account for up to 40 per cent of growers (Nagiah & Azmi, 2012) are less able to afford any financial losses, particularly during extended periods of haze. Thus, even if the advisory recommends a suspension of all outdoor activities, since outdoor activities in the rural areas are often directly tied to income, many of these rural populations are unwilling or unable to afford suspension of these activities.

Furthermore, the nature of housing with large yards and domesticated animals require daily manual upkeep outdoors, which is hard to avoid. This often also involves burning of plant-based yard detritus, as municipal services are limited in these areas. It is notable that while there are formal prohibitions for open burning at all times under the Malaysian Environmental Quality Act 1974, this does not extend to the burning of such domestic detritus. Furthermore, other small-scale rural agriculture activities like burning of paddy husks, sugarcane leaves, and pineapple stumps are also excluded from this open burning prohibition. While the government can declare a ban on all burning including these exempted activities, this is only done when the haze reaches hazardous levels (this year, it was declared on September 11) (Bernama, 2019b) and difficult to be implemented. Hence, rural populations are generally exposed to more smoke, be it during haze or non-haze periods.

Furthermore, rural populations in remote areas with poorer transport infrastructure (Martin, Rieple, Chang, Boniface, & Ahmed, 2015) may need several hours to get to the nearest town. Combined with the prohibitive higher price of the N95 masks as discussed above, this limits the access of these populations to proper protection against the haze. This is, of course assuming these populations are properly made aware of the risks. Public health education and healthcare for the most remote populations is provided by mobile health clinics, covering vast areas (Thomas, et al., 2011). Hence, even if these clinics were to advise on the risks at the time of haze outbreaks, this information would take time to reach the population, and would be very much dependent on the initiative of these population to attend briefings (further exposing them to haze), which they may not be interested or at liberty to do. Other ways in which the government attempts to inform the public on the dangers of haze is mainly through online portals like the Air Pollutant Index of Malaysia website (apims.doe.gov.my) and the official online portal of the Ministry of Health Malaysia (moh.gov.my). There are also several haze warning apps available for mobile phones, like MyIPU, Malaysia Air Pollution Index, AirVisual and Haze Malaysia. However, coverage in the most rural areas is weak (Ab Aziz & Mohamad Ali, 2015) and therefore these would likely have little effect.

Indeed, a recent study comparing rural and urban population in Klang Valley, Malaysia in knowledge, attitude and practise in relation to haze (Vethanayagam & How, 2017) shows that there is a significant difference between these two groups. In terms of knowledge, 70% of the urban residents have an average level of knowledge, and 21.5% have high knowledge on haze. In turn, 50% of rural residents have average knowledge and 33% of them have low knowledge. This has translated directly to practise; 88% of rural residents engage in bad health practises during haze episodes compared to 74.5% urban residents. These results were all statistically significant.

This fits into what Macintyre (2002) describes as the collective explanations for variations in health. The social and economic structures which are outside of the control of rural Malaysian populations, like the nature of work (many in the same sector causing the problem) and lifestyle, design of houses, and ease of access to utilities and public services, would likely result in a situation where the health and wellbeing of poorer, rural Malaysian populations are consistently marginalised during haze episodes. This is further exacerbated with interventions and advisories that are too general to likely be effective for these already marginalised populations.

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A Fair Exchange?: The Oil Palm as an Ideological Crop

As seen in the above discussions, the Malaysian government has downplayed (1) the role of Malaysian companies in the sector, (2) the effect of the haze on health, and (3) the health advisories and interventions prescribed. In accordance with the collective political economy explanation (Bambra, 2016), this paper argues that such decisions were political choices in line with the interests of the agribusiness sector. As Manzo and Padfield (2016) explain, "climate change can be viewed as a class-based issue of injustice and a problem of unequal relations of power between rich and poor people". In this case, the "rich" are the well-connected companies within the Malaysian palm oil plantation sector.

While this can be seen to be a class-based issue of political choice, we argue that this has been subconsciously accepted by the general population (not only the rich) due to the ideological importance of this sector to the developmental trajectory of the nation. As the second largest producer of palm oil, this commodity has come to occupy a position of immense significance in Malaysia. The country accounts for about 39% of world palm oil production and 44%of world exports. Oil palm plantations in Malaysia make up 70% of agricultural land and about 16% of total land area. The local palm oil industry is an important driver of economic growth, steadily contributing 5 to 6% of the country's GDP (about RM69.3 billion in 2015), and plans have been made to increase palm oil revenue to RM178 billion by this year (Clean Malaysia, 2015). It is a major source of rent from abroad, with palm oil exports bringing in annual export earnings of over RM67.5 billion (Yusof, 2019).

Palm oil in Malaysia is primarily produced on oil palm estates owned by large companies (Basiron, 2007). The estates provide employment for local communities, both directly through employment on the plantations and indirectly through 'nucleus and plasma' arrangements, through which surrounding smallholders (up to 40% of the sector, as mentioned above) are contracted to sell their fruit bunches to company-owned mills for extraction. The companies also often build hospitals, schools, and religious buildings for use by the local communities. In this way, the sector has become one of the biggest employers in Malaysia and expansion of the sector has been an important strategy for poverty alleviation and development among rural communities (Basiron, 2007).

The land clearing practises associated with the industry is linked back to the idea that natural resource exploitation is a necessary tool to aid development (Hezri & Hasan, 2006). The beginnings of this was most visible during the (fist) Mahathir era, where, faced with criticism of the country's vigorous logging activities in the 1980s, he fervently defended Malaysia's position, including at the United Nations Conference on the Environment and Development (UNCED) held in Rio de Janeiro in 1992. He argued that "we are not exploiting the forests for no good reason. We need money. We have to export wood because we need the foreign exchange without which we cannot buy what we want" (Sustainable Development News, 1992). Mahathir specifically accused Western nations of trying to shift the blame for the deteriorating global environment onto developing countries (Bankoff & Elston, 1994), saying that such practises "could indirectly keep countries like Malaysia from achieving the same levels of development" (circa 1989 in Karim, 2008).

Mahathir's insistent rejection of the "eco-imperialist" position of wealthy developed countries (Hezri & Hasan, 2006) was lauded not only among Malaysians but also among many other countries in the developing world. Subsequent Malaysian leaders have echoed Mahathir's sentiments, and continued access to natural resources have remained crucial to Malaysian economic and development policy (Sloane-White & Beaulieu, 2010). Malaysia's abundant natural resources, and its continued willingness to exploit these resources, enabled the country to enjoy massive and sustained economic growth to become one of the 'East Asian miracle' economies (Raman, 2006).

This push back against eco-imperialism continues until today within the palm oil sector. The sector has been under attack by western counties due to several unsustainable practises including deforestation, fires, and conflicts with communities and wildlife (Pye, 2019). Unsurprisingly, Malaysian politicians see the neo-colonial west yet again telling them what to do. For example, the current Ministry of Primary Industries repeatedly argues that any criticism of the sector is a western ploy against Malaysia's development (Bunyan, 2019). This deepens the Malaysian government's denial of the harm caused by haze and downplaying of the severity of the haze, as it continues the narrative that palm oil is indeed being grown sustainably in Malaysia. Such sentiments are further promoted through very visible images like the government's 2019 Love My Palm Oil Campaign and the RM50 note upon which the oil palm tree is prominently featured next to a famous image of Malaysia's first prime minister, Tunku Abdul Rahman

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saluting the declaration of Merdeka (independence).

As a result of all this, we argue that the Malaysian population has been largely socialised to view the palm oil as an ideological crop that plays an important role in poverty alleviation and national development. In turn, the promotion of the necessity of natural resource exploitation in this process has also socialised many Malaysians to the view that environmental degradation, and in turn deteriorating health, is an acceptable trade-off for economic growth. This can be reflected in the results of a recent study done by De Pretto et al (2015) which found that the majority of the Malaysian public experienced only mild psychological stress over the haze, not amounting to acute stress reaction syndrome (Ho et al., 2014). The haze, essentially, has become a normal, and somewhat necessary, "part of life".

Conclusion

Bambra and Fox (2007) have argued that in a neoliberal society, the provision of care by governments is increasingly influenced by the political economy. A strong economy is seen as essential, and as such, the amount of health care provided are set within these boundaries. In the context of the transboundary haze in Malaysia, the government's response to the issue has been a result of political choices made in line with the interests of Malaysia's economically significant and powerful agribusiness sector. To maintain a strong economy supported by palm oil and the exploitation of natural resources in general, the government has downplayed the role of the sector in causing the haze, the severe effects of haze on health, and the advisories and interventions during the haze season.

As such, the health of the Malaysian population is exchanged for economic growth to a certain extent. This marginalisation has been subconsciously accepted by the general population due to the ideological importance of this sector to the developmental trajectory of the nation. Indeed, environmental degradation, and in turn, deteriorating health is commonly seen as an acceptable trade-off for economic growth in Malaysia. Unfortunately, particularly marginalised sections of the society (the less educated, rural poor) would tend to suffer the most in terms of health outcomes. As a textbook example of a government balancing the healthcare needs of the local population with the larger political economy landscape, we argue that the political choices made in relation to government responses to haze can indeed explain any geographical health inequalities in this context in Malaysia (Bambra, 2016).

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