

Social, Economic, and Environmental Factors Determining COVID-19 Severity in Malaysia: Lessons Learnt from Non-Pharmaceutical Interventions

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MASA POLICY DEVELOPMENT PROGRAMME

POLICY BRIEF 17

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2022

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Publisher:



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PREFACE

Institut Masa Depan Malaysia (MASA) is an independent think tank that brings together experts in government and academia to provide quality research, policy recommendations, and analysis on the full range of public policy issues guided by the shared prosperity values.

Since its inception, MASA has been actively involved in shaping national policies and frameworks. MASA Policy Development Programme (MPDP) was introduced as a pioneering initiative aimed at promoting policy research among researchers from public and private universities across the country, in alignment with the Shared Prosperity Vision 2030 and the Sustainable Development Goals, which are integrated with the 12th Malaysia Plan.

Through the MPDP 1.0 initiative, 30 Policy Briefs have been successfully produced, encompassing policy input and recommendations across sectors such as economics, social issues, education, and sustainable development.

MASA expresses its gratitude to Dr. Teh Bor Tsong and his team for the production of this policy brief. The commitment of the MPDP grant recipients, along with close cooperation with relevant stakeholders, is highly appreciated and is hoped to continue making a positive impact on national policy development.

Azril Mohd Amin

Chief Executive Officer

Institut Masa Depan Malaysia

ABOUT MASA

Institut Masa Depan Malaysia (MASA) is an independent think tank that brings together experts in government and academia to provide quality research, policy recommendations, and analysis on the full range of public policy issues guided by the shared prosperity values.

MASA was established in January 2019. The formation of the organisation was inspired and mandated by the Seventh Prime Minister, YABhg. Tun Dr Mahathir Mohamad and the Eighth Prime Minister, YB Tan Sri Dato' Haji Muhyiddin Bin Haji Md Yassin. It was founded out of a passion to forward the philosophy of shared prosperity in Malaysia and this region.

MASA also was commissioned by the government of Malaysia to author and develop the Shared Prosperity Vision 2030 plan as the new socioeconomic plan for Malaysia.

Our Vision

To be a thought leader on policy ideas and analysis guided by shared prosperity values.

Our Mission

To create a world where no one is left behind by influencing policymakers to develop data-driven policies that ensure equitable wealth distribution and continuous improvement of people's well-being.

ABOUT MPDP

MASA Policy Development Programme (MPDP) is a pioneering effort in promoting policy research that has become part of MASA's flagship project, in line with the 12th Malaysia Plan which is aligned with the Shared Prosperity Vision and the Sustainable Development Goals.

The research grant, introduced for the first time in 2021, received an encouraging response public and private institutions of higher learning as well as non-governmental organizations.

MPDP researchers have produced studies across various strategic areas, including multidimensional poverty, education for the B40 group, sustainable urban planning for low-income communities, regional inclusivity in Sabah and Sarawak, social enterprise models for Micro, Small and Medium Enterprises (MSMEs), green economy potential and food security.

Other strategic areas of studies include empowerment of the ecotourism sector, climate change, health preparedness and crisis resilience, addressing learning loss, business acceleration, affordable housing and social protection.

All these are reflections of the initiatives and aspirations, inspired by the 8th Prime Minister and Chairman of MASA, Tan Sri Dato' Haji Muhyiddin bin Hj. Md. Yassin.

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16.	Exploring the Determinants of Community Well-being in Endemic Period: A Comparison Study between Rural and Urban Community	Dr. Naziatul Aziah Mohd Radzi
17.	Social, Economic, and Environmental Factors Determining COVID-19 Severity in Malaysia: Lessons Learnt From Non-Pharmaceutical Interventions (NPIs)	Dr. Teh Bor Tsong
18.	Human Capital Transformation in Talent Management Affecting Kelantan State Employee Performance During Pandemic COVID-19	Dr. Iskandar Hasan Tan bin Abdullah
19.	Pembangunan Sabah ke Arah Mencapai Kelestarian Hidup Masyarakat dan Kunci Kepada Malaysia Sebagai Negara Maju 2025	Dr. Mohd Ikbal bin Mohd Huda

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29.	Sustainable Development Goals (SDG): From STEM to Employability	Prof. Dr. Teoh Sian Hoon
30.	Big Data Analytics (BDA) Capability Model for SMEs: Post COVID-19	Dr. Mohammad Falahat

TABLE OF CONTENTS

Table of Contents	1
Biography	2
Executive Summary	5
Introduction	7
Current Policy Option	10
Results and Discussions	12
Policy Recommendations	20
Conclusion	29
References	30

BIOGRAPHY

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Teh Bor Tsong, a Senior Lecturer at the University of Malaya's Department of Urban and Regional Planning, holds a Ph.D. in Regional Environment Systems, an M.Sc. in Urban and Regional Planning, and a B. Urban and Regional Planning (Hons.). He received the Japanese Government Monbukagakusho Scholarship (MEXT) for his Ph.D. studies, and he has been recognized with various academic honors. Furthermore, Teh Bor Tsong is a registered Graduate Town Planner in Malaysia, a Graduate Member of the Malaysian Institute of Planner, and an Accredited Professional Member of CASBEE Iskandar.

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Leng Pau Chung is a Senior Lecturer at Universiti Teknologi Malaysia, holding a Ph.D. in Architecture with a focus on Natural Ventilation and Sustainability. He is a recognized Professional Technologist in Green Technology and has a strong background in Architecture. Leng's research includes projects related to optimizing natural ventilation and adopting IBS systems in the Malaysian construction industry. He has authored journal articles and book chapters, showcasing his expertise in sustainable building design. His academic and research contributions demonstrate a commitment to advancing knowledge in the field of sustainable architecture.

NUR AULIA ROSNI

Nur Aulia Rosni is a Senior Lecturer at the Department of Urban and Regional Planning, Faculty of Built Environment, University of Malaya (UM). She obtained her PhD in International Islamic University Malaysia in 2018 and joined UM in the same year. She has published many articles, chapters in books and books during her study related to Land Use Planning, Urban Park and Recreational Planning, GIS and Remote Sensing Application in Urban Planning, Planning Law and Governance. Her research interests are in land use planning and urban analytics, transportation planning, planning law and urban management. Her recent research projects focus on land use planning for urban parks, urban placemaking and physical planning for elderly-friendly neighbourhoods.

Executive Summary

COVID-19 severity (infection rate and mortality rate) can be connected to the social, economic, and environmental factors. However, the knowledge for this subject has not been well-established in Malaysia. Therefore, this study aims to examine the factors affecting the COVID-19 pandemic situation in Malaysia. It investigates three major factors (social, economy and environment).

Thirteen States and two Federal Territories of Malaysia were considered; and the data for the attributes of each major factor are derived from the official reports of Department of Statistics Malaysia.

Meanwhile, the infection rate and mortality rate of COVID-19 cases were obtained from the Ministry of Health Malaysia. The data for these COVID-19 outcome variables were covered between January 19, 2020 and December 31, 2021. Using a non-parametric statistical approach (Kendall's Tau-b Correlation), the social, economic and environmental factors that contribute to the COVID-19 infection rate and mortality rate in Malaysia are identified.

First, for social factors the study found that the percentage of non-citizen, average household income and number of students per teacher has positive relationship with COVID-19 infection rate and mortality rate.

Second, in terms of economic factor, the percentage of primary industry has a negative relationship with COVID-19 infection rate and mortality rate.

Third, in the matter of environmental factor, it is noticed that the population density and percentage of high-rise residential buildings are positively related to the COVID-19 infection rate.

Learning from these research findings, the study noticed that COVID-19 is more severe in urban areas due to higher population density, high concentration of high-rise residential buildings, higher student-to-teacher ratio, higher household income and a wider outreach of broadband penetration. Place-based approaches and together with equitable and inclusive development can be the way forward to long-term resilience and sustainable way to address COVID-19 or future emergency outbreak of similar magnitude.

Introduction

For nearly two and a half years, our world has been greatly affected by the COVID-19 pandemic. Akin to the global situation, Malaysia too, is not immune to the negative impacts brought about by COVID-19 which has threatened the lives and livelihoods of our community.

As of June 31, 2022; COVID-19 confirmed cases in Malaysia has reached a whopping 4.5 million victims (equivalent to 14% from our national population of 32.6 million people), with 36 thousand deaths (WHO, 2022).

In light of improving this unprecedented situation in Malaysia, built environment related professionals have been actively initiating various discussions concentrating on theoretical urban development debates over the possible future directions that spatial planning (Rameli 2021; Gunasilan, 2020), density (Lim et al., 2021) and urban design (Ujang, 2021; Soo, 2020) should take.

Several attempts of empirical studies can be observed in Malaysia. At the fine geographical scale, Aw et al. (2021) examined the relationship of population density with COVID-19 cumulative cases and mortality rate by using Pearson regression focusing on 143 districts in Malaysia from January 25, 2020 to December 31, 2020.

Meanwhile, Ganasegeran et al. (2021) conducted an ecological study by applying hierarchical cluster analysis and region-wise correlation on cities from five (5) different regions in Malaysia to determine the correlation between population density with COVID-19 clusters as well as incidence that happened between January 22, 2020 and February 4, 2021.

In terms of empirical clinical study, Sim et al. (2020) analysed COVID-19 patient admission records from 18 designated hospitals in Malaysia between February 1, 2020 and May 30, 2020, focusing on the sociodemographic, clinical histories and diseases staging factors through univariate and multivariate logistic regressions.

These studies demonstrate that there are limited research efforts in Malaysia to explore high risk viral infection determinants from a more holistic perspective which includes the dimensions of social, economy and environment.

There are strong indications that social behaviors and non-pharmaceutical approaches, despite being intangible, indirect, and leaning towards pro-sociality (i.e. collective interest) via cooperative actions, are able to curb the pandemic; however, much emphasis has been focused on pharmaceutical efforts to produce vaccines. Through this research, the identification of factors that are significantly linked to the COVID-19 cases in Malaysia is able to help shed light and alleviate our country out of this predicament.

To this end, this study aims to examine the social, economy and environment factors affecting the COVID-19 infection rate and mortality rate in Malaysia at the state level. Results from this study provides an insight for government policymakers, epidemiologists, environmentalist and urban planners in not only understanding the situation, but also aid in formulating mitigation policies and control measures.

Key Messages and Recommendations

Recommendation 1

- To decentralised development planning by balanced population distribution and equitable urban services.

Recommendation 2

- To improve rural-urban linkages: linking urban towns to small towns and rural growth centers.

Recommendation 3

- To review the role of employers, especially in the sectors of construction and manufacturing in high-risk states.

Current Policy Option

In ensuring the health and wellbeing of the community, Malaysian government has adopted various preventive measures aiming to curb the COVID-19 spreading. First, the travel restriction to limit the mobility and physical contact of the community. Several phases have been enacted nationwide beginning from MCO (Movement Control Order), CMCO (Conditional Movement Control Order) and RMCO (Recovery Movement Control Order).

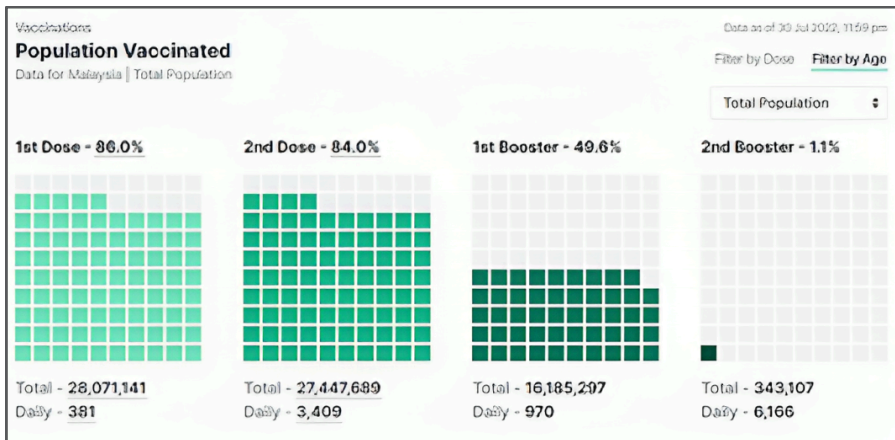
It is considered as a drastic measure, especially during the movement control order (MCO) period, most community have to stay at home, working from home (remote working) and learning from home (distance learning). The operation for most economic sectors (in exception for utility services and basic essential services) are limited. In addition, international and interstate travelling are carefully monitor, to prohibit any COVID-19 carrier from entering the nation.

Second, the assembly restriction to limit the public gathering minimise the mobility and physical contact of the community. The assembly for most events often involve mass visitors in the crowd setting where people tend to have close contact with others (either consciously or unconsciously). Thus, any COVID-19 outbreak the spread would be serious.

Therefore, all religious (e.g. Friday Prayer), sports, social (e.g. Wedding) and cultural activities are closely regulated to minimise the close interaction among the community. Third, the mandatory enforcement of standard operating procedures (SOPs) for individual and business operator.

In the efforts to minimise the transmission of COVID-19, the community are suggested to practice the SOPs including wearing mask, frequent hand washing and sanitising, social distancing, temperature monitoring, MySejahtera apps recording.

Last but not least, the vaccination program for the community. The government initiated COVID-19 immunisation programme to ensure that all citizens and non-citizens residing in Malaysia to receive vaccines and be fully protected against COVID-19. As of July 30, 2022, the nationwide vaccinated population (first and second dose) is about 85% (Ministry of Health Malaysia, 2022).



Results and Discussions

The present study includes thirteen States and two Federal Territories in Malaysia comprising of Perlis, Kedah, Pulau Pinang, Perak, Selangor, Negeri Sembilan, Melaka, Johor, Pahang, Terengganu, Kelantan, Sarawak, Sabah, Federal Territory of Kuala Lumpur, Federal Territory of Putrajaya, and Federal Territory of Labuan.

Furthermore, the study focusses on the timeframe from January 19, 2020 to December 31, 2021 (more or less two years period of COVID-19 since Malaysia's first reported case begin). The COVID-19 cases and deaths data by state in Malaysia were extracted from the Ministry of Health Malaysia's (MOH) official website (<http://covid-19.moh.gov.my>, accessed on July 1, 2022).

The attributes of the social, economy and environment determinant factors were examined in this study: social factor (percentage of non-citizen, average household income, incident of poverty, number of students per teacher); economy factor (percentage of primary industry, percentage of secondary industry, percentage of tertiary industry); and environment factor (population density, percentage of high-rise residential, hospital beds per inhabitants, number of inhabitants per medical doctor, percentage of broadband penetration rate).

The data regarding to the attributes of the social, economy and environment determinant factors are derived from the up-to-date state-level statistic report (My Local Stats) published by the Department of Statistics Malaysia (DOSM).

Using non-parametric statistical approach (Kendall's Tau-b Correlation), the result of the study is presented on Table 1.

Table 1

Association between Social, Economy and Environmental Factor with the COVID-19 Infection Rate and COVID-19 Mortality Rate

Factor	Attributes	COVID-19 Infection Rate		COVID-19 Death Rate	
		Correlation Coefficient	P-Value	Correlation Coefficient	P-Value
Social	Percentage of Non-Citizen	0.350*	0.029	0.483**	0.005
	Average Household Income	0.517**	0.003	0.383*	0.019
	Incident of Poverty	-0.322*	0.043	-0.186	0.160
	Number of Student per Teacher	0.533**	0.002	0.733**	0.000
Economy	Percentage of Primary Industry	-0.485*	0.029	-0.349*	0.032
	Percentage of Secondary Industry	0.135	0.487	0.117	0.550
	Percentage of Tertiary Industry	0.000	1.000	-0.580	0.766
Environment	Population Density	0.367*	0.024	0.300	0.053
	Percentage of High-Rise Residential	0.393	0.017	0.393	0.017
	Hospital Beds per Inhabitant	-0.117	0.264	-0.150	0.209
	Number of Inhabitant per Medical Doctor	-0.083	0.326	-0.083	0.326
	Percentage of Broadband Penetration Rate per Inhabitant	0.217	0.121	0.350*	0.029

Note:

Statistically significant results (*P<0.05 and **P<0.01) are displayed in bold.

*P<0.05 correlation is significant at the 0.05 level (1-tailed).

**P<0.01 correlation is significant at the 0.01 level (1-tailed)

The attributes of social, economy and environment factor demonstrate statistically significant relationship to the COVID-19 infection rate: percentage of non-citizen, average household income, incident of poverty, number of students per teacher, percentage of primary industry, population density, and percentage of high-rise residential.

All these attributes show positive correlation with the COVID-19 infection rate in exception for the incident of poverty and percentage of primary industry exhibit negative correlation with the COVID-19 infection rate. However, there were no relationship between the percentage of secondary industry, percentage of tertiary industry, hospital beds per inhabitants, number of inhabitants per medical doctor and percentage of broadband penetration rate.

Meanwhile, the percentage of non-citizen, average household income, number of students per teacher and percentage of primary industry indicate statistically significant relationship to the COVID-19 mortality rate. No relationship is found between COVID-19 mortality rate with the following attributes of social, economy and environment factor: incident of poverty, percentage of secondary industry, percentage of tertiary industry, population density, percentage of high-rise residential, hospital beds per inhabitants and number of inhabitants per medical doctor.

Based on these results, more detail discussion is elaborate on the subsequent section.

(1) The Urban Trend: More People in Less Space – Rapid Urbanisation Threatens Public Health

The study shows that COVID-19 is palpably more infectious and deadly in locations of higher population density. Other variables that have been shown to share similar effects are locations with a higher concentration of high-rise residential buildings, higher student-to-teacher ratio, higher average household income and a wider outreach of broadband penetration.

It is not a coincidence that all these happen to be the characteristics exhibited by urban areas. Supporting this notion is the fact that the statistical results from the study also reveal a lower prevalence of COVID-19's impact on locations actively involved in primary industries, i.e. agriculture, mining and quarrying – these areas can be largely found in suburban and rural areas with lower population density.

This is a clear indication that a densely populated urban area consists of high-density settlements, with high mobility and interactions between people pose health threats to the inhabitants, as evidently shown in the case of an emergency epidemic such as the COVID-19 outbreak.

It is not surprising that populous urban areas especially in the states of Selangor, Johor and Wilayah Persekutuan Kuala Lumpur were right at the forefront of public health emergencies, as the nation grapples with the COVID-19 pandemic.

The statistical results have definitely further ascertained the negative externalities brought about by rapid urbanisation in Malaysia. Currently, our country is experiencing urbanisation at a faster rate than other countries in Southeast Asia and has since become the most urbanised non-city-state in the region - with 77% (2020) of urbanites.

With the trend paving the way for an “urban Malaysia” in the near future, this predicament will generate more pressure on various already overburdened urban infrastructures and public services. Overcrowding caused by rapid urbanisation and unplanned urban growth has manifested threats to our public health and thus highlighting the long-term need for better management.

In light of COVID-19 containment and measures by the government, the application of place-based approaches to policy responses has highlighted the particular importance of the role that urban and regional planning can play in combating such outbreaks.

As a lesson learned from the COVID-19 advent, the urban population living in densely populated areas has turned into an extremely vulnerable group. As such, the following policy recommendations are narrated along the nuances of dispersing the population out of urban areas and also limiting the rate of urban migration.

(2) Dissecting the Plight of Legal/ Documented Migrant Workers: Reduce Vulnerability, Increase Inclusivity

The statistical result of this study showed that a higher percentage of non-citizens in Malaysia contributes to a higher COVID-19 infection rate as well as COVID-19 fatality rate. The result is in tandem with the fact that, since the announcement of COVID-19-induced movement restriction in Malaysia, reports have shown a growing number of cases and emerging clusters among migrant workers, especially from the sectors of agriculture, construction, and manufacturing in high-risk states such as Selangor and Wilayah Persekutuan Kuala Lumpur.

Globally, studies have mainly attributed the issue to poor housing arrangements, e.g. overcrowded shared dormitories that are often left in unsanitary conditions. These have led to difficulties to practice social distancing and good hygiene among the said workers.

Malaysia shares similar sentiments as the Ministry of Health Malaysia did raise the issue of migrant workers living in small and cramped accommodations – calling for a re-look at the minimum standards of the Housing and Employee Facilities Act 1990 (Act 446). Due to this problem, Wahab (2020) found that during the advent of COVID-19, it is extremely difficult for migrant workers to maintain and observe social distancing.

The author continues to state that, adding in more problems such as the lack of proper water supply and electricity and basic sanitary products (MalaysiaKini, 2018), this makes it impossible for the workers to maintain good hygiene.

Prior to the COVID-19 outbreak, the majority of migrant workers were faced with the lack of access to healthcare. Loganathan, Rui, Ng & Pocock (2019), supported by Wahab (2020) in their studies done on exploring the barriers of migrant workers' access to healthcare in Malaysia found that the accessibility status of the said group to healthcare services in the country is indeed dangerously low and extremely questionable.

The authors continued to stress that complex contributors to the predicament includes affordability and financial constraints, the need for legal documents like valid passports and work permits, discrimination and xenophobia, physical inaccessibility and employer-related barriers.

Based on healthcare charges derived from Hospital Sungai Buloh (2022) and also an article published in the Malay Mail (2017), there is a huge disparity in the healthcare charges for citizens and non-citizens making healthcare fees exponentially higher for even the documented migrant workers.

Illiteracy and language barrier became yet another challenging issue that has been made worse during the pandemic – further stunting efforts for health-related information dissemination.

Lack of information means that the migrant workers are unable to make informed choices and decisions in a timely manner. Furthermore, Loganathan, Rui, Ng & Pocock (2019) highlighted that language barriers do affect the quality of care received by migrant workers, which might lead to undesirable medical errors and also prevent them from giving truly informed consents.

From this event, a lesson learned is that migrant workers are often neglected and excluded from policy development and national actions in times of emergency. The way forward is to not alienate migrant workers, and not perceive them as a separate community living temporarily in our country.

Migrant workers' stay in Malaysia should be viewed and deliberated in a strategic manner. The following policy recommendations aim to improve the welfare and reduce the vulnerability of migrant workers as an approach to promoting inclusivity among our communities.

Policy Recommendations

The COVID-19 pandemic has taught the nation that such emergency outbreaks can expose issues and loopholes relating to human settlement, spatial development and government authorities' functioning. It has also been realised that there is an inherent risk when a government only executes short-term responses such as mask wearing and social distancing.

On the flip side, this provides opportunities for alternative solutions where longer-term priorities can be given more attention to be included in the immediate response measures to boost national and community resilience.

(1) Decentralised Development Planning: Balanced Population Distribution and Equitable Urban Services

Internal migration, alongside economic growth, has contributed greatly to the restructuring of the Malaysian society. This trend can be largely attributed to two general factors, at least from the urban-rural push-pull factors perspective; i) lesser able-bodied people are willing to work in the agricultural sector accepting lower pay in the rural areas, and ii) more people from the same cohort prefer to work in the services and manufacturing sectors enjoying a higher pay in the urban areas.

As the push-pull factors continue down this route, the rate of urban migration will not be showing signs of slowing down.

The advent of the COVID-19 pandemic gave rise to the question of whether this pattern or trend of human settlement is consistent with a desirable future sustainable national population. To answer this, a decentralised approach can be critical, especially in times of a public health emergency.

As mentioned earlier, with the current Malaysian population being densely concentrated in the urban areas, attempts to decentralise the national population should thus be conducted in a tactical manner - it is time to focus on establishing strategies and the way forward for our national settlement system.

The long-term goal here is to achieve sustainable and balanced population growth. The decentralised development planning and human settlement should be considered hand-in-hand with equitable distribution of resources and services.

The process of decentralisation can be a challenging one but should be achievable through collaborative inter-sectoral planning with careful consideration of the concept of population distribution. The population discourse across locations in Malaysia should not only be about the number of residents living in an area but also where they will live, in what condition and what sort of opportunities are in store for them.

Decentralised and provision of good infrastructures and services in areas outside of the urban periphery provide for a stable foundation to support plans of the national settlement system.

Such a model is not only based on equitable distribution of land and resources but correspondingly provides opportunities for distributing health, education, water and telecommunication infrastructures.

A decentralised planning approach also calls for minimum mobility and offers space for healthy human interactions in a more intimate scale.

Decentralised infrastructure and services reduce dependency on the central system. It provides the opportunity for resource recovery which can be planned and modified in a timely manner, in tandem with the requirements and needs of the end users.

Towns with decentralised systems should be able to keep up with the provision of essential services to inhabitants in the event of future emergencies and lockdowns such as the one caused by the COVID-19 outbreak.

On the same note, decentralisation also applies to the devolution of resources, tasks and decision-making power to democratically elected lower-level authorities that can be partially independent of the central government.

In other words, it is highly recommended to empower the local authorities to a justifiable level while still being monitored by the central government.

After all, it has been witnessed that at times of emergency during the COVID-19 outbreak, authorities at the state and local levels were steadfast in responding to the situation. These authorities were responsible for critical aspects of COVID-19 containment measures, health care and social services – putting them at the frontline of crisis management.

This is a piece of critical evidence showing the capabilities of the state and local authorities in times of need. It also points out that responsibilities should be shared (and burdened) among levels of government in a coordinated manner, especially in case of emergencies.

Decentralisation can strengthen national, state and local-level support to vulnerable groups in both urban and rural areas. This not only puts a stop to further deterioration of their predicaments in cases of emergencies but also provides opportunities to strengthen place-based inclusivity simply by facilitating access to infrastructures and services – supporting long-term sustainable and balanced population distribution.

(2) Improve Rural-Urban Linkages: Linking Urban Towns to Small Towns and Rural Growth Centers

In the context of rural and regional development, small towns and rural growth centers (RGCs) are nodes strategically pinpointed to establish linkages between central governments, urban regions, and rural areas. The spatial linkages and sectoral interactions between rural and urban areas have received increasing recognition for the ability to assume meaningful roles in regional development and rural-urban interactions.

These are the ideal settings to locate accessible infrastructures and services, assign functional local government systems with adequate resources and authority as well as to transmit government policies and inject modernisation. The efficacy of these small towns and RGCs responding to the needs of related communities should be able to help retain population, limit out-migration and even facilitate in-migration in the long run.

Improved urban-rural linkages and rural modernisation presents itself as a strategic component for town planners to make the most out of the small towns and RGCs in terms of maximising the economic benefits which trickles down from urbanisation. On this note, the link between people, goods, infrastructures, services, and sectoral interactions, e.g. non-agricultural jobs, can be further upgraded.

This opens up opportunities for rural areas to have better provisions of education and health services for example, and thereby slowing the shift of people moving to urban areas.

The current practice of development planning in Malaysia, as reflected in our development plans, is based on the dichotomy between rural and urban settlements. This circumstance not only widens the rural-urban development gap, but also creates a development bias where urban nodes are given more attention, while rural nodes are often neglected. It is thus highly recommended to shift attention to developing rural nodes as well as promoting rural-urban linkages.

This requires decentralised development approaches that are driven by local needs and priorities with active participation from related stakeholders, especially all levels of government bodies. The role of the state government is especially important to bridge, facilitate and support policies emanating from the national level to the local level.

(3) Reviewing the Role of Employers, Especially in the Sectors of Construction and Manufacturing in High-Risk States

As employers in Malaysia largely only focused on workplace conditions neglecting the employees' housing conditions, the Human Resources Ministry has gazetted new regulations for the minimum standards that employers must follow titled the Employees' Minimum Standards of Housing, Accommodations and Amenities (Accommodation and Centralized Accommodation) Regulations 2020. With the problem of housing conditions addressed, now it boils down to tackling the other two burning issues.

As mentioned earlier, migrant workers face barriers to accessing health care. It may stem from their reluctance to seek medical attention due to the expenses of medical care and fear of deportation. Studies done in Malaysia have reiterated similar themes, and ascertained the suspicion surrounding migrant workers' lack of access to healthcare services beyond the control of the health sector.

Apart from that, language barriers may affect the quality of care received by migrant workers as well – which can inadvertently result in medical errors. Ministries of Health and employers should work together closely to increase migrant worker's access to public healthcare facilities.

As employers play a big part in preventative measures during such outbreaks, they should initiate timely health screenings and protective actions to safeguard the health of the workers under their care. As many have suggested, outbreak prevention and containment measures should be made as a legal commitment for employers in the near future.

(4) Breaking Down the Language Barrier and Improving Information Dissemination among Migrant Workers

As the Malaysian economy relies heavily on migrant workers to perform low-skilled jobs, the variety of nationalities and cultures collated within the country's community can pose a challenge. One such issue that has been around even prior to the COVID-19 outbreak is the language and communication barriers, especially in the construction and manufacturing sectors.

The issue has been made more prominent with the advent of COVID-19, in high-risk and high density states such as Selangor. In a positive light, this opens up opportunities for relevant parties to kickstart dialogues on ways to minimise the negative externalities brought about by language and communication barriers faced by migrant workers.

Critical information that can alter migrant workers' decision makings should be communicated to them in a language that they can comprehend. Information on public health and hygiene, for example, should be advocated and be made aware to the migrant workers in easily understandable formats. To support employers in their obligations, the government can consider providing financial support through rebates or waivers of levies during times of emergencies.

Time and time again, studies have emphasized on the need to establish strategic communication plans that encompass inter-sectoral collaborations between the government and related stakeholders including employers, embassies and non-profit organisations (NGOs). Suggestions have been made to establish inter-agency and inter-sectoral task forces to disseminate information and coordinate humanitarian aid to this vulnerable and at-risk cohort.

To support this effort, timely public reporting of current situations on the ground, e.g. detailed breakdown on positive cases and emerging clusters among non-citizens or migrant workers, should be prioritised.

Conclusion

At the state-level of Malaysia, several social, economic and environmental factors were found statistically significant correlated with COVID-19 outcomes. For social factor, the percentage of non-citizen, average household income and number of students per teacher shows a positive relationship with the COVID-19 infection rate and mortality rate. The percentage of primary industry (from economic factor) has a negative association to the COVID-19 infection rate and mortality rate.

Meanwhile, with regards to environmental factor, both population density and percentage of high-rise residential buildings contributed positively to the COVID-19 infection rate. These findings suggest that the COVID-19 are more severe at the location of densely populated and higher percentage of non-citizen. This reveals the weakness of our national human settlement and migrant worker policy in response to public health. Place-based approaches together with equitable and inclusive development can facilitate long-term locality resilience which is a more sustainable way to COVID-19 or future emergency outbreak of similar magnitude.

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e ISBN 978-629-95423-5-3



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