



Coronavirus (COVID-19) Post-Control Study of University Students: Case Study of Spatial Distribution of Universiti Malaysia Sarawak (UNIMAS) Students and National COVID-19 Cases

**Tarmiji Masron, Danggat Chabo, Nur Faziera Yaakub, Ailis Elizabeth Epa, Ahmad Hata Rasit,
Mohd Suhaidi Salleh, Sharizal Hashim, Mohd Hairulnizam Mohd Zamri**

Monograph

**Centre for Spatially Integrated Digital Humanities (CSIDH)
Faculty of Social Sciences and Humanities, Universiti Malaysia Sarawak**

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Faculty of Social Sciences and Humanities
Universiti Malaysia Sarawak
94300, Kota Samarahan
Sarawak

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Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Coronavirus (COVID-19) Post-Control Study of University Students: Case Study of Spatial Distribution of Universiti Malaysia Sarawak (UNIMAS) Students and National COVID-19 Cases/

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ISBN 979-967-18074

e-ISBN 978-967-18074-0-8

1. Coronavirus (COVID-19). 2. Students Distribution. 3. Universiti Malaysia Sarawak. 4. National COVID-19 Cases. 5. Geographic Information System. I. Prof Dr. Tarmiji Masron. II. Danggat Chabo. III. Nur Faziera Yaakub. IV. Ailis Elizabeth Epa. V. Prof Dr. Ahmad Hata Rasit. VI. Dr. Mohd Suhaidi Salleh. VII. Dr. Sharizal Hashim. VIII. Mohd Hairulnizam Mohd Zamri.

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Acknowledgment

Contentedly, we would like to express our deepest gratitude to the Faculty of Social Sciences & Humanities (FSSH) and Universiti Malaysia Sarawak (UNIMAS) for supporting us in completing this monograph.

Let's unite to control the spread of the COVID-19 pandemic.

Preface

According to World Health Organization (WHO), Coronavirus (COVID-19) is a major threat to the global health crisis and may leave serious impacts on socioeconomic and social development. In Malaysia, the first case of COVID-19 infection was positively identified involving a local citizen on the 4th of February 2020. The increasing number of positive cases across Malaysia has indirectly impacted the education sector, particularly on all the academic programs. Various medical and non-medical approaches have been and are being combined in finding the best solution for all sectors and societies to be back on track with new norms. The university perspective is very interesting to explore especially in the COVID-19 situation due to its obligation to handle and manage a mass number of students and staff. In these present days and time, the advances in mapping technology have now created new opportunities for public health administrators to improve the planning, analysing, monitoring, and managing of better health systems. This monograph covers and discusses the spatial distribution of Universiti Malaysia Sarawak (UNIMAS) Students and the National COVID-19 cases by using the administrative district boundary as the unit of analysis.

Therefore, the findings of this study are expected to assist the authorities in planning the post-MCO management, predominantly for the returning of students to campus to be more manageable. With that, the spread of COVID-19 outbreaks can also be monitored and controlled especially in the process of health screening, hostel accommodation and lecture schedule. In this study, the sources of data

are divided into two parts: Data of students from UNIMAS database as well as data from the National Security Council (MKN) and Ministry of Health Malaysia (MOH). This monograph does cover all students by dividing and focusing them into five (5) main groups which are pre-university, undergraduate, postgraduate, final year undergraduate and faculty. Students are then being mapped according to their gender. As a result, the total number of maps produced covering all categories and groups of UNIMAS students is 252.

Tarmiji Masron,
Danggat Chabo,
Nur Faziera Yaakub,
Ailis Elizabeth Epa,
Ahmad Hata Rasit,
Mohd Suhaidi Salleh,
Sharizal Hashim,
Mohd Hairulnizam Mohd Zamri

@ CSIDH, FSSH, UNIMAS
1 Shawal 1441AH/ 24th of May 2020

I dedicate this monograph to my late *Abah*, who had returned to our Creator on the 18th of April 2020. The COVID-19 pandemic, Movement Control Order (MCO) and the South China Sea made everything appeared so close, yet so far. It took me a week to reach home. Things had forced the usual 3-hours journey to become one week, and that was the longest week in my life.

Abah – the person who painted my life beautifully amazing. The man who throughout his lifetime taught me to always value things. The one who always reminded me the importance of knowledge. The kindest, beautiful soul who would be etched on my heart, memory and mind forever. *Abah*, your presence is unrepeatable and your love is irreplaceable.

Two different worlds, two different frequencies. Sending endless love from afar, Al-Fatihah.

Also, I would like to express my deep gratitude and sincere appreciation to Polis Diraja Malaysia (PDRM) for the benevolent and munificent help in making my way suave and safe during MCO. Despite the circumstances, everything went well. *Alhamdulillah Ala Kulli Haal*.

Nur Faziera Yaakub

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Abbreviations

COVID-19	Novel Coronavirus	SAR	Secondary Attack Rate
FACA	Faculty of Applied and Creative Arts	UNIMAS	Universiti Malaysia Sarawak
FBE	Faculty of Built Environment	WHO	World Health Organization
FCSHD	Faculty of Cognitive Sciences and Human Development		
FCSIT	Faculty of Computer Sciences and Information Technology		
FE	Faculty of Engineering		
FEB	Faculty of Economics and Business		
FLC	Faculty of Language and Communication		
FMHS	Faculty of Medicine and Health Sciences		
FRST	Faculty of Resource Science and Technology		
FSSH	Faculty of Social Sciences and Humanities		
GIS	Geographic Information System		
KKM	Kementerian Kesihatan Malaysia		
MCO	Movement Control Order		
MKN	National Security Council		
MOH	Ministry of Health		
PMO	Prime Minister Office		
RMO	Restricted Movement Order		

1.0 Introduction

Upon welcoming and cherishing the fresh new start of 2020, the end of the year 2019 somehow has been marked as a sad adjourn due to the Novel Coronavirus (COVID-19) outbreak. COVID-19 is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Maxwell *et al.*, 2020; Boulos & Geraghty, 2020). Reflecting on the severity level of the illness, World Health Organization (WHO) on the 30th of January 2020 has declared COVID-19 as a Public Health Emergency of International Concern and a pandemic disease (WHO, 2020a). On the 11th of February 2020, WHO announced a name for the new coronavirus disease: COVID-19 (WHO, 2020b). Beyond human prediction, control and sight, COVID-19 suddenly creates global health concerns in a short time. As of the 13th of April 2020, a total of 1,5853,155 patients have been tested positive and 114,247 of confirmed deaths have been reported to WHO (WHO, 2020b).

According to WHO, COVID-19 is a major threat to the global health crisis and may leave serious impacts on socioeconomic and social development (WHO, 2020b). In Malaysia, the first case of COVID-19 infection was positively identified involving a local citizen on the 4th of February 2020 (Prime Minister Office of Malaysia, 2020). As of the 13th of April 2020, the total number of recorded cases was 4,683 and 76 number of deaths (Ministry of Health Malaysia, 2020a). In this regard, Malaysia has taken a proactive step by declaring the Malaysian Movement Control Order 2020 (MCO) as a precautionary measure against the COVID-19

outbreak under the Prevention and Control of Infectious Diseases Act 1988 and the Police Act 1967 from the 18th of March to the 30th of March 2020 (Phase 1) after the sudden cumulative increase of 553 cases on the 16th of March 2020 (Prime Minister Office of Malaysia, 2020). Meanwhile, according to the Sarawak State Disaster Management Committee Secretariat Report, the number of cumulative positive cases in Sarawak was 341 cases as of the 13th of April 2020 since the first positive case reported on the 13th of March (Laporan Sekretariat Jawatankuasa Pengurusan Bencana Negeri Sarawak, 2020).

Over and above that, besides the heart-rending effects on socioeconomic and social development, the increasing number of COVID-19 positive cases across Malaysia has also indirectly impacted the education sector particularly on all the academic programs at universities around the world, including all public and private universities in Malaysia. Universiti Malaysia Sarawak (UNIMAS) is amongst the universities impacted. This scenario drives apprehension as we know that universities hold a major portion of the First Class Human Capital for our beloved country, Malaysia. In conjunction with the current situation, various medical and non-medical approaches have been and are being combined in finding the best solution for all sectors and societies to be back on track with new norms.

In these present days and time, the advances in mapping technology have now created new opportunities for public health administrators to improve the planning, analyzing, monitoring and managing of better health systems. Health mapping has expanded

dramatically when Dr. John Snow's research was once using the application of the Geographic Information System (GIS) in addressing the epidemic has been uploaded to the internet. With that, it reflects the strong capability of GIS as an appropriate spatial-based technique solution to be applied in general health management (Colledge *et al.*, 1996; Johnson & Johnson, 2009). The integration of GIS with the health field, especially in epidemiology is expected to assist in analyzing and monitoring infectious diseases and thus, reducing the spread of disease among the community.

This monograph covers and discusses the “Spatial Distribution of UNIMAS Students and National Coronavirus COVID-19 Cases” by using the administrative district boundary as the unit of analysis. Through this research and mapping, the spatial relationship between the origin of UNIMAS Students with COVID-19 cases will be visualized. The origin of students is to be used during the screening process of students returning to campus. It acts as the background to reflect the history as well as the severity of COVID-19 for each district. Therefore, the findings of this study are expected to assist the authorities in planning the post-MCO management, predominantly for the returning of students to campus to be more manageable. With that, the spread of COVID-19 outbreaks can also be monitored and controlled especially in the process of health screening and hostel accommodation. Plus, theories and practical learning processes can resume and be conducted systematically by practicing social distancing, by taking into account the number of students per class at one time.

2.0 Literature Review

Tracing back the medical records, the first case of COVID-19 was reported on the 17th of November 2019 and it was originated from Wuhan, Hubei Province, China (Maxwell *et al.*, 2020; Hackoum & Abdallah, 2020; Kang *et al.*, 2020; Boulos & Geragthy, 2020). In the early phase, the virus was observed spreading gradually. However, after one to two months, the outbreak has entered a new phase where it is seen to be uncontrollable because of the rapid transmission between humans. WHO (2020) describes that there are four (4) levels of COVID-19 transmission which are; i) No cases reported, ii) Sporadic cases, iii) Clusters of cases and iv) Community transmission. With that, the number of cases suddenly bombarded. It spreads faster compared to the 2002/2003 SARS-CoV and the 2012-2014 MERS-CoV (Boulos & Geragthy, 2020). Besides China, the population in South Korea, Italy and Iran are amongst the highly impacted with the massive outbreak (Strzelecki, 2020).

Epidemiology is the knowledge of the transmission pattern of a disease or event related to health and the factors that influence or trigger it to occur. Epidemiological research is normally used to conduct studies on health-related events to control their invasion. The terms epidemic, endemic and pandemic are usually used in epidemiology. The coronavirus (COVID-19) crisis has been haunting the entire countries as of today. These outbreaks have occurred in a larger scope and are not confined to a community or district alone. The COVID-19 pandemic has spread so widely and rapidly that it is

out of control and capable of killing many valuable lives in a short time.

The integration of point of views between medical and geography has shown that the endless movement of people around the world has aided in mobilizing the virus. Plus, the continuous physical contact has intensified in transferring the virus. This is because the modes of COVID-19 transmission are through droplets. To relate, poor ethics of coughing, sneezing and touching among people has worsened the transmitting of COVID-19 (WHO, 2020c). Hence, as of the 13th of April 2020 according to Ministry of Health Malaysia, it is spreading and infecting more than 186 countries around the world which then caused a total number of 1,847,097 cases and 114,102 deaths (Ministry of Health Malaysia, 2020b). In Malaysia, as of the 13th of April 2020 according to Ministry of Health Malaysia the total number of cases was 4,817 with 77 number of death (Ministry of Health Malaysia, 2020b). Everyone, regardless of age, gender or class is vulnerable as a target of this new coronavirus. The figures of infected people keep increasing day by day, or worse, doubling.

Centre for Diseases Control and Prevention (CDC) (2020) reported that the symptoms of the virus may develop and appear in between 2-14 days. The most noticeable symptoms are fever, sore throats and shortness of breath. The late show up of symptoms on an individual makes it hard to detect the infected clusters of people. Hence, this may be the answer to the sudden reciprocate in the number of cases at one time. The number of cases explodes internationally in a short time, forcing many countries to implement the mitigation. In Malaysia, the government has introduced Restricted Movement Order

(RMO) which has started on the 18th of March 2020 to combat the plague as well as to flatten the curve. It is projected to be implemented stage by stage for a few months until everyone and everything is clean and free.

Since this pandemic is new, the studies on the outbreak are limited. Therefore, it is crucial to understand as well as to predict the spatial patterns of the outbreak. Mapping the spatial distribution of UNIMAS Students with the number of cases is necessary for effective pandemic monitoring as it helps the university in visualizing the pattern of infection. According to Chainey *et al.* (2008), different mapping techniques are used to depict hotspots including point, spatial ellipses, thematic and quadrats, interpolation, and kernel density estimation. Of mapping the spatial distribution of UNIMAS students and COVID-19 cases, the point is used. In point mapping, the distribution of discrete geographic phenomena (i.e., an object or event) is depicted using identical dots.

2.1 COVID-19 Pandemic

SARS-CoV-2 is a virus that caused an outbreak involving the respiratory tract that was first detected in Wuhan, China in December 2019. Initially, most of the patients were said related to seafood and animals sold at the Wuhan Seafood Market. However, the number of patients has increased and most of them have no history of going to the market and this indicates that the virus is transmitted among humans (human to human transmission) (Shereen *et al.*, 2020). Until

today, the rate and ability of this virus to spread among humans are still unknown and under epidemiological investigation.

2.2 Geographic Information System (GIS) and Infectious Diseases

Epidemiology and GIS are two imperative fields of sciences. Both fields are widely applicable and specifically capable of helping governments and health professionals to map out the disease patterns so that they can take steps to combat and prevent the COVID-19 pandemic. This has led to the process of monitoring the spread of outbreaks by using GIS-based mapping that has become increasingly important for controlling and managing the infectious disease phenomenon. In the context of the COVID-19 outbreak, GIS and big data technologies have been able to identify outbreaks of infection, spatial prevention to control the outbreak and detection of social space sentiment with other factors (Zhou *et al.*, 2020). As of the current health emergency, the integration of these two fields may save many valuable lives on the Earth.

Besides, GIS and spatial analysis are important tools that can be used to map and monitor outbreaks as well as geographic patterns of infectious diseases (Gilruth *et al.*, 2007). Geoprocessing and digital mapping techniques have been used to analyze health issues and spatial analysis to map epidemic data distribution patterns. This technique enables the development of a model for predicting possible risks for the affected regions as well as mapping the environmental conditions of a pandemic distribution pattern. Also, spatial statistics

are a useful technique for pandemic mapping. For instance, the clustering (cluster) analysis, hotspot analysis and spatial coordination analysis are among the most commonly used methods (Pfeier *et al.*, 2008).

2.3 Risk Management

The COVID-19 pandemic gives a new insight into health science, risk management and organizational behavior discussion. There are growing discussion and concern on the continuing rise and the ability to sustain declining rates of COVID-19 infections. At all levels, such as government, organization and individual; face enormous challenges as they try to combat the COVID-19 pandemic and concerns about resuming activity in a manner that sustains progress made in suppressing transmission. For now, according to Singh and Adhikari (2020), Liebig *et al.* (2020) and Boldog *et al.* (2020), due to the absence of vaccines, social contact is crucial for determining the spread control of the infection and, therefore social distancing measures, isolation measures, quarantines and border closures do appear to be the most effective means of risk mitigation.

Specifically, looking from the organization's perspective, discussion on how an organization such as university facing unprecedented challenges and risks of the post-COVID-19 outbreak is also remarkably interesting to be explored. With dramatic changes in the global higher education landscape due to the spread of the COVID-19, universities are quite vulnerable in facing such a pandemic crisis. One of the risks that worry the most is about the

second attack of the pandemic when the staffs and students travel back to the university to resume teaching and learning activities, which can create the risk of superspreading secondary attack of COVID-19. Referring to Liu *et al.* (2020), returning to the previous routine will contribute to the secondary attack rate (SAR), defined as the probability of infection occurring among individuals across a specific group. Most universities have a large community group and once affected, it will lead to a great and wide spreading. In addition, Sun *et al.* (2020) also expect that it will be a risk of second attacks or otherwise known as second wave import and export infections that will pose the challenge of post-COVID-19 management. Therefore, epidemiological studies of COVID-19 examining the geographical data distribution and movement patterns are vital to managing the risk of relapse COVID 19 (Boulos & Geraghty, 2020).

According to Gallagher (2020), human travel movement can be a serious weakness in slowing the outbreak and if left unchecked, it could be a major source of risk for becoming a super spread that infects many areas. Therefore, a detailed understanding of distribution risks from geographical view will help organizations to plan effective post-pandemic control measures by using limited resources and provide support for clinical care in the face of post-COVID-19 challenges (Sun *et al.*, 2020; Boldog *et al.*, 2020).

3.0 Problem Statement

On the 31st of January 2020, the World Health Organization (WHO) has declared the coronavirus outbreak as a global health emergency. According to Johns Hopkins University data, as of the 8th of April 2020, five (5) countries have surpassed 100,000 pandemic positive cases. The United States remains the worst affected country with 387,574 positive cases. Spain and Italy ranked second and third, with 140,618 and 135,586 respectively. France now surpasses Germany and has been ranked fourth in the COVID-19 positive case with a total of 110,049 cases. While Germany ranks fifth with 107,591 cases. In the meantime, the death from this pandemic has surpassed 81,000 victims worldwide. France today joins three (3) other countries in which the outbreak has surpassed 10,000 cases. Italy remains the worst country to record 17,127 deaths.

In Malaysia, the World Health Organization (WHO), based on available data, estimates that Malaysia will show the highest number of hospitalized patients by mid of April. Although there are signs of case-level curvature being horizontal, it may jump back if existing preventive measures are eased and the public is no longer obeys the MCO. The situation is very worrying as of the 10th of April 2020, the five (5) largest clusters contributed to the reciprocation of cases are *Perhimpunan Seri Petaling*, *Persidangan Keagamaan Kuching*, wedding ceremony in Bandar Baru Bangi, individuals with travel history from Italy and sub-cluster from Seri Petaling in Rembau (Kementerian Kesihatan Malaysia, 2020). Also, a small cluster in

Hospital Teluk Intan, Perak was recently discovered. While, in East Malaysia, Kuching and Samarahan District were in the Red Zone.

Applied to the whole Peninsular Malaysia as well as Sabah and Sarawak, the First Phase of MCO started from the 18th of March until the 31st of March 2020. The Second Phase of MCO continued from the 1st of April to the 14th of April 2020. Next, the Third Phase of MCO started on the 15th of April to the 28th of April 2020 and the Fourth Phase of MCO continued the 29th of April until the 12th of May 2020. However, Senior Minister Datuk Ismail Sabri Yaakob said that Malaysia has moved to The Fifth Phase of MCO a week earlier before it was supposed to be introduced to the public. Plus, the Fifth Phase of MCO, also known as Conditional Movement Control Order (CMCO) was a little different as it targeted and focused more on the risky areas as well as zones.

By referring to our current situation, the COVID-19 pandemic has affected the economy, society and education system either directly or indirectly. Some things are fastly affected and some things are slowly but surely affected. On the economic obverse, the COVID-19 pandemic has affected economic activity including income and household spending patterns. For a country that adopts an open economy, the COVID-19 has impacted the interactions between national economic agents including the Home Sector, the Business Sector, and the Foreign Market. This situation poses a bigger challenge to the country's economy despite the Government Sector injecting RM128 billion of economic stimulus for households (Department of Statistics Malaysia, 2020).

On the education side, for example, the current health emergency has forced many kindergartens, primary schools, secondary schools as well as other education organization including university to be temporarily close. Among all the educational organizations, the university perspective is very interesting to explore especially in the COVID-19 situation due to its obligation to handle and manage a mass number of students and staff. This is because students do come and originate from different districts across all states in Malaysia. Most of the students come from affected zones and areas of COVID-19 and some come from the Red Zone. Therefore, epidemiological studies of COVID-19 examining the distribution patterns (who, when, and where) and risk factors that exist are crucial in managing the risk of relapse of COVID 19. Hence, identifying the location or locality of the students is important in implementing the student re-entry screening action when the next semester begins. Above and beyond, the results and findings of the study will be evaluated and filtered by using a risk management approach to be parallelly adapted and blended to the research context. Risk management is important for identifying key factors that can be considered in drafting post-COVID-19 planning and policy.

4.0 Data and Methodology

In this monograph, the sources of data are divided into two parts: UNIMAS data as well as data from the National Security Council (MKN) and Ministry of Health Malaysia (MOH). Data from the university refers to the total number of UNIMAS Active Students for Semester II, Session 2019/2020. The total number of UNIMAS

Active Students for Semester II, Session 2019/2020 obtained through references on MyMoheS system is 13,971 students. The number of students who are being focused on this monograph does only cover the number of local students, which means students from Malaysia. Meanwhile, data from the MKN and MOH refer to the reported number of the National COVID-19 cases.

The spatial distribution of Universiti Malaysia Sarawak (UNIMAS) Students and National Coronavirus (COVID-19) cases does cover all students by dividing and focusing them into five (5) main groups which are pre-university, undergraduate, postgraduate, final year undergraduate and faculty. For the faculty, there are a total of ten (10) faculties. Namely are Faculty of Social Sciences and Humanities (FSSH), Faculty of Engineering (FE), Faculty of Medicine and Health Sciences (FMHS), Faculty of Economics and Business (FEB), Faculty of Cognitive Sciences and Human Development (FCSHD), Faculty of Resource Science and Technology (FRST), Faculty of Applied and Creative Arts (FACA), Faculty of Language and Communication (FLC), Faculty of Built Environment (FBE) and Faculty of Computer Sciences and Information Technology (FCSIT). Ensuing from the total number for each group from these five (5) main groups, students are then being mapped according to their gender which is male and female. As a result, the total number of maps produced covering all categories and groups of UNIMAS students is 252.

Both sources of data for this research are focusing up until district boundary across all states in Malaysia as the unit of analysis. The COVID-19 cases data include case reporting from the First Phase

of MCO from the 18th of March to the 31st of March 2020, followed by the Second Phase of MCO from the 1st of April to the 14th April 2020 and the Third Phase of MCO from the 15th of April to the 28th of April 2020. However, the visualization and mapping of the distribution of COVID-19 cases are being presented and visualized based on a one-week interval. Full data of daily cases will be shown in the table. Geographic Information Systems (GIS) will be the main platform for analyzing and presenting the results in this monograph.

5.0 Analysis and Discussion

Similar to the other Higher Learning Institution, UNIMAS comes with a large community. Hence, the big information and data have made it a challenge for university management to make the decision in curbing and controlling the spread of COVID-19. Plus, the geographical issue arises when the reported and categorized districts of COVID-19 Red Zone is not viewed with the spatial element. The relationship between the spatial distribution of UNIMAS Students with National COVID-19 Cases will be analyzed and mapped by using GIS. The spatial model produced can be used in providing Standard Operating Procedure (SOP) for the process of student screening on the campus. Hence, the planning and management of post-MCO for the returning students to campus is more manageable and can reduce the spread of outbreaks.

In the main, UNIMAS Students do come from various districts and states in Malaysia. The number of students in each district is sourced and it is then being mapped according to their

gender which is male and female. The significance of mapping the gender distribution of UNIMAS Students and the COVID-19 cases is to focus on the composition of the vulnerable groups affected by the COVID-19 pandemic. In the light of rising concern about the current COVID-19 pandemic, a growing number of universities across the world have either postponed or canceled all events such as lectures, workshops, conferences, sports, and other activities. These are all done to aid flatten the curve. Most importantly, universities are now taking other intensive measures to prevent and protect all students as well as staff members from the highly infectious disease.

Map 1 until Map 6 shows the spatial distribution of UNIMAS 2019/2020 Pre-University Students and National Coronavirus (COVID-19) cases. The total number of UNIMAS Pre-University Students for the 2019/2020 Academic Session is 613. Most of the students come from the Sarawak Zone namely Kuching (173), Samarahan (38), Bintulu (29), Miri (25) and Sibu (23). The number of female students is higher than male students which are 369 and 244 respectively.

Map 7 until Map 12 shows the spatial distribution of UNIMAS 2019/2020 Male Pre-University Students and National Coronavirus (COVID-19) cases. As visualized by the map, most of the male students are from Sarawak (184). The highest number of male students is from Kuching (89), followed by Samarahan (20) and afterward Bintulu (14).

Map 13 until Map 18 shows the spatial distribution of UNIMAS 2019/2020 Female Pre-University Students and National

Coronavirus (COVID-19) cases. The highest number of female students is from Kuching (84), followed by Samarahan (18) and next Johor Bahru (16). All these three (3) districts were labeled as Red Zone for the COVID-19 cases. Kuching recorded 240 cases, Samarahan with 51 cases and Johor Bahru with 184 cases on the 14th of April 2020.

Table 1 shows the total of UNIMAS 2019/2020 Pre-University Students and National COVID-19 cases by district and gender. On the 21st of March 2020, during the First Phase of MCO (18th – 31st of March 2020), five (5) districts recorded high cumulative cases that exceeded 41 cases. Kuala Lumpur with 166 cases, Petaling with 96 cases, Hulu Langat with 75 cases, Johor Bahru with 52 cases dan Seremban with 44 cases. At the end of the First Phase of MCO, there were 13 districts categorized as Red Zone. Kuala Lumpur with 430 cases, Hulu Langat with 265 cases, Petaling with 234 cases, Seremban with 119 cases, Johor Bahru with 112 cases, Kluang with 107 cases, Kuching with 97 cases, Kota Bahru with 80 cases, Kinta with 77 cases, Klang with 74 cases, Tawau with 63, Gombak with 62 cases and Hilir Perak with 57 cases. Kuching district fell under the Red Zone started on the 24th of March 2020.

During the Second Phase of MCO (1st – 14th of April 2020), there was an increase in the COVID-19 positive cumulative cases. As of the 7th of April 2020, there were 170 new cases, resulting in 3,963 COVID-19 cases in Malaysia. Samarahan recorded a total of 42 cases and became the Red Zone. By the end of the Second Phase of MCO, there were 170 new cases and that resulted in 4,987 positive cases of COVID-19 in Malaysia. Muar recorded a total of 44 cases and became

the Red Zone. Hence, UNIMAS needs to pay attention to pre-university students because 89 male and 84 female students come from the Red Zone.

Map 19 until Map 24 shows the spatial distribution of UNIMAS 2019/2020 Undergraduate Students and National Coronavirus (COVID-19) cases. The total number of Undergraduate Students for the 2019/2020 Academic Session is 12,013. The number of female students is higher than male students who are 7,948 and 4,065 respectively.

Map 25 until Map 30 shows the spatial distribution of UNIMAS 2019/2020 Male Undergraduate Students and National Coronavirus (COVID-19) cases. By referring to the map, a total of 2,288 male students are from Sarawak. Most of these students come from high-risk areas and Red Zone. Initially, Kuching District recorded only 30 cases as of the 30th of March 2020. However, the number of cases increased to 97 as of the 31st of March 2020, next increased to 182 on the 7th April 2020 and subsequently increased to 240 on the last day of the Second Phase of MCO.

A total of 488 male students are originated from Sabah and the Federal Territory of Labuan. At the district level, 62 male students are from Tawau. Tawau was also categorized as the Red Zone with 79 cases recorded as of the 14th of April 2020. Meanwhile, the district of Mersing, Jempol and Sik recorded the lowest number of male students with 3, 2 and 1 students respectively. In terms of the COVID-19 distribution cases, Sik recorded only 1 case since the First Phase

of MCO until the end of the Second Phase of MCO on the 14th of April 2020.

Map 31 until Map 36 shows the spatial distribution of UNIMAS 2019/2020 Female Undergraduate Students and National Coronavirus (COVID-19) Cases. By referring to the map, a total of 4,405 female students are from Sarawak. They are mostly from Kuching (1344), Sibul (400), Miri (358), Samarahan (345), Asajaya (174), Petaling (171), Johor Bahru (146), the Federal Territory of Kuala Lumpur (128), Seremban (125), Kinta (121) and Kota Kinabalu (115). Among the mentioned districts, Johor Bahru, Petaling, Kuala Lumpur and Seremban were categorized as the Red Zone areas upon the First Phase to the completion of the Second Phase of MCO.

Despite the Red Zone area, there were still areas that remain as the Green Zone with 0 cases such as Pokok Sena, Yan, Machang, Hulu Terengganu, Beluran, Kudat, Nabawan, Putatan, Tenom, Tongod, Asajaya, Belaga and Kapit. There are also many female students who come from COVID-19 free areas such as Asajaya.

Table 2 shows the total number of UNIMAS 2019/2020 Undergraduate Students and National COVID-19 cases by district and gender. Many districts recorded zero (0) cases during the first wave from the 25th of January 2020 until the 15th of February 2020. Only a few districts fell under the Yellow Zone, namely Petaling with 8 cases, Johor Bahru with 4 cases, while Kota Setar, Langkawi, and Seremban recorded the same number of cases which is 2 cases. Meanwhile, the East Coast Zone, Sabah and the Federal Territory of Labuan as well as Sarawak had zero (0) cases and remained as the Green Zone.

Map 37 until Map 42 shows the spatial distribution of UNIMAS 2019/2020 Final Year Undergraduate Students and National Coronavirus (COVID-19) cases. Meanwhile, Table 3 shows the total number of UNIMAS 2019/2020 Final Year Undergraduate Students and National COVID-19 cases by district and gender. In total, the Final Year Undergraduate Students in UNIMAS is 4,969. Most of them come from the Sarawak Zone such as Kuching (749), Samarahan (238) and Sibu (235). Kuching was a Red Zone from the 31st of March to the 14th of April 2020. Samarahan was also a Red Zone from the 1st of April to the 14th of April 2020. A total of 101 Final Year Undergraduate Students are from Kinta and the district recorded 77 COVID-19 positive cases on the 31st of March 2020 and 93 cases on the 7th and 14th of April 2020.

Map 43 until Map 48 shows the spatial distribution of UNIMAS 2019/2020 Male Final Year Undergraduate Students and National Coronavirus (COVID-19) cases. Of the total number of the Final Year Undergraduate Students, 1,744 are male. Most of them come from Kuching (282), Samarahan (108), Miri (62) dan Petaling (41). Kuching, Samarahan and Petaling districts were the Red Zone and only Miri remained as the Yellow Zone until the end of the Second Phase of MCO. Map 49 until Map 54 shows the spatial distribution of UNIMAS 2019/2020 Female Final Year Undergraduate Students and National Coronavirus (COVID-19) cases. The number of Final Year Undergraduate Female Students is 3,225. Most of them come from the Sarawak Zone, specifically are Kuching (332), Samarahan (68), Miri (49) dan Sibu (41). Kuching recorded 240 positive cases and Samarahan recorded 51 cases at the end of the Second Phase of MCO.

Map 55 until Map 60 shows the spatial distribution of UNIMAS 2019/2020 Postgraduate Students and National Coronavirus (COVID-19) cases. To boot, Table 4 shows the total number of UNIMAS 2019/2020 Postgraduate Students and National COVID-19 cases by district and gender. The total number of postgraduate students is 1,345. The five (5) states that record the highest number of students are Sarawak (1018), Selangor (58), Kuala Lumpur (47), Sabah (45) and Perak (41). While, the states that record the lowest number of students are from the Federal Territory of Labuan (1), the Federal Territory of Putrajaya (1), Terengganu (6) and Kedah (8). During that period, only three (3) COVID-19 positive cumulative cases were recorded in Petaling.

Based on Table 4, 23 postgraduate students come from Petaling and 11 postgraduate students come from Johor Bahru. This is a worrying situation for the returning of students, hence, UNIMAS needs to tighten the procedure for students screening, especially to those who come from the Red Zone such as Petaling and Johor Bahru.

On the 15th of February 2020, there were six (6) affected districts. Namely are Kota Setar, Langkawi, Petaling, the Federal Territory of Kuala Lumpur, Seremban and Johor Bharu. There are students who originated from those affected districts and the number of students from Kota Setar is 3, from Langkawi is 1, from Petaling is 23, from the Federal Territory of Kuala Lumpur is 47, from Seremban is 10 and from Johor Bahru is 11.

Until the 21st of March 2020, 153 new cases have been reported. The total number of COVID-19 positive cases increased to 1,183. Ten (10) states with more than 41 positive cases were Selangor

(292), the Federal Territory of Kuala Lumpur (166), Sabah (136), Johor (129), Negeri Sembilan (70), Sarawak (68), Kelantan (61), Perak (55), Pulau Pinang (50) dan Kedah (47). Five (5) districts that fell under the Red Zone were the Federal Territory of Kuala Lumpur (166), Petaling (96), Hulu Langat (75), Johor Bahru (52) dan Seremban (44). Based on Table 4, 47 of the postgraduate students come from the Federal Territory of Kuala Lumpur.

As of the 31st of March 2020, there were 140 new cases, resulting in a total number of 2,766 COVID-19 positive cases in Malaysia. After two (2) weeks of the implementation of the First Phase of MCO, the number of cumulative cases in the Red Zone increased.

There were ten (10) districts categorized as the Red Zone. Namely are Seremban with 119 cases, Johor Bahru with 112 cases, Kluang with 107 cases, Kuching with 97 cases, Kota Bahru with 80 cases, Kinta with 77 cases, Klang with 74 cases, Tawau with 63 cases, Gombak with 62 cases and Hilir Perak with 57 cases. There are 10 postgraduate students who come from Seremban, 11 from Johor Bahru and 6 from Kluang.

On the 7th of April 2020, there was an additional of seven (7) Red Zone. Namely are Sepang, Putrajaya, Jerantut, Rembau, Jasin, Batu Pahat and Samarahan. The number of students who come from Sepang is 1, from Putrajaya is 1, from Rembau is 1, from Jasin is 1, from Batu Pahat is 4 and from Samarahan is 107. Meanwhile, no postgraduate students come from Jerantut.

As of the 14th of April 2020, Sarawak recorded fifteen (15) new cases of COVID-19, hence bringing the total number of cases in Sarawak to 363 since the first reported case on the 13th of March 2020. Most of the UNIMAS postgraduate students are from Kuching (524) and Samarahan (107). Both districts remained as the Red Zone until the end of the Second Phase of MCO.

Map 61 until Map 66 shows the spatial distribution of UNIMAS 2019/2020 Male Postgraduate Students and National Coronavirus (COVID-19) cases. In total, there are 524 male postgraduate students. Most of the male postgraduate students come from Kuching (192), Samarahan (39), the Federal Territory of Kuala Lumpur (29) and Sibü (28). From the listed districts, Kuching, Samarahan and the Federal Territory of Kuala Lumpur were categorized as the Red Zone.

Meanwhile, Map 67 until Map 72 shows the spatial distribution of UNIMAS 2019/2020 Female Postgraduate Students and National Coronavirus (COVID-19) cases. In total, there are 821 female postgraduate students. Most of the female postgraduate students come from Kuching (332), Samarahan (68), Sibü (41), the Federal Territory of Kuala Lumpur (18), Petaling (15) and Johor Bahru (10). On the 31st of March 2020, the number of positive cases in Kuching was 97, and the number continued to increase to 182 cases on the 7th of April 2020 and next, 240 cases on the 14th April 2020.

Map 73 until Map 78 shows the spatial distribution of UNIMAS 2019/2020 Students from Faculty of Social Sciences & Humanities (FSSH) and National Coronavirus (COVID-19) cases. In total, there is 1,617 number of students registered under FSSH. In

terms of gender composition, there are 503 male students and 1,114 female students.

Of the total number of students, 858 students in FSSH come from the Sarawak Zone with gender composition of 270 male students and 588 female students. At the district level, 227 of them come from Kuching with gender composition of 66 male students and 161 female students. Next, 67 students are originated from Samarahan with gender composition of 22 male students and 45 female students. Subsequently, the number of students coming from Sibu is 58, where 21 of them are male students and 37 are female students. There are also 51 students come from Miri with gender composition of 16 male students and 35 female students. The number of students coming from Saratok is also 51, but with different gender composition of 17 male students and 34 female students. Of the districts mentioned above, Kuching and Samarahan were classified as the Red Zone with 240 cases and 51 cases respectively on the 14th of April 2020.

The total number of students from the Sabah Zone and the Federal Territory of Labuan is 268 with gender composition of 81 male students and 187 female students. By district, 37 of the students come from Tawau with gender composition of 11 male students and 26 female students. Next, 31 of the students are originated from Kota Kinabalu with gender composition of 8 male students and 23 female students. Of these two districts, Tawau recorded 79 cases on the 14th of April 2020 and it was categorized as the Red Zone.

A total of 118 students come from the Central Zone where 36 of them are male students and 82 are female students. Central Zone is the largest affected area of the COVID-19 cases because Gombak,

Hulu Langat, Hulu Selangor, Klang, Petaling, Sepang, the Federal Territory of Kuala Lumpur and the Federal Territory of Putrajaya are located in this zone. During the First Phase until the end of the Second Phase of MCO, there were three (3) districts continued to record over than 41 cases, namely the Federal Territory of Kuala Lumpur, Petaling and Hulu Langat with 899, 359 and 433 cases respectively (Map 79 until Map 90 & Table 5).

Map 91 until Map 96 shows the spatial distribution of UNIMAS 2019/2020 Students from Faculty of Engineering and National Coronavirus (COVID-19) cases. The total number of students in Faculty of Engineering is 1,566. In terms of gender composition, 852 are male students and 714 are female students.

A total of 1,062 students come from the Sarawak Zone with gender composition of 578 male students and 484 female students. At the district level, 383 students come from Kuching with gender composition of 205 male students and 178 female students. Next, 107 students are from Miri with gender composition of 51 male students and 56 female students. Following, 106 of the students come from Samarahan with gender composition of 65 male students and 41 female students. From these three (3) districts, Kuching and Samarahan were categorized as the Red Zone.

Further, 169 of the students also come from the Sabah Zone and the Federal Territory of Labuan with gender composition of 86 male students and 83 female students. As well, 33 of them come from Kota Kinabalu with gender composition of 15 male students and 18 female students. As of the 14th of April 2020, Kota Kinabalu was categorized as the Yellow Zone with a record of 40 cases. Next, 21 of

the students originated from Tawau with gender composition of 10 male students and 11 female students. Tawau was classified as the Red Zone with a record of 63 cases on the 31st of March 2020, and then further increasing to 67 cases on the 7th of April 2020. The number of cases continued increasing with 12 cases, hence making the total case on the 14th of April 2020 as 79 cases (Map 97 until Map 108 & Table 6).

For Faculty of Medicine and Health Sciences (FMHS), the total number of students is 927 with gender composition of 225 male students and 702 female students. Map 109; Map 110; Map 111; Map 112; Map 113 and Map 114 show the spatial distribution of UNIMAS 2019/2020 Students from Faculty of Medicine and Health Science Undergraduate Students and National Coronavirus (COVID-19) cases. Map 115; Map 116; Map 117; Map 118; Map 119; Map 120 shows the spatial distribution of UNIMAS 2019/2020 Male Undergraduate Students from Faculty of Medicine and Health Science and National Coronavirus (COVID-19) cases meanwhile Map 121; Map 122; Map 123; Map 124; Map 125 and Map 126 show the spatial distribution of UNIMAS 2019/2020 Female Undergraduate Students from Faculty of Medicine and Health Science and National Coronavirus (COVID-19) cases.

Of the total number of students, 422 are from the Sarawak Zone with gender composition of 111 male students and 311 female students. By district, 150 of them come from Kuching with gender composition of 44 male students and 106 female students. Next, 52 of the students are originated from Samarahan with gender composition of 16 male students and 37 female students. On the 7th of April 2020,

the number of COVID-19 positive cases in Kuching and Samarahan was 182 and 42 respectively. The number of cases then increased to 240 and 51 correspondingly on the 14th of April 2020.

Also, most of the students from this faculty do come from the Southern Zone. There are 120 of them with gender composition of 36 male students and 84 female students. By district, 25 of them come from Seremban as well as from Johor Bahru with the same-gender composition of 5 male students and 20 female students for both districts. Subsequently, 11 of the students do come from Batu Pahat with gender composition of 6 male students and 5 female students. These three (3) districts were all categorized as the Red Zone on the 14th of April 2020.

Besides, 110 of the students do also come from the Northern Zone with gender composition of 28 male students and 82 female students. By district, 12 of them are originated from Kinta with gender composition of 3 male students and 9 female students. Kinta was listed as one (1) of the Red Zone on the 7th and 14th of April 2020 (Table 7).

In lieu of Faculty of Economics and Business (FEB), the total number of students is 1,991 with gender composition of 569 male students and 1,422 female students (Table 8). Of the total number of students, 1,125 are from the Sarawak Zone with gender composition of 319 male students and 815 female students. By district, 330 of them do originate from Kuching with gender composition of 93 male students and 237 female students. Next, 179 of the students come from Sibu with gender composition of 54 male students and 125 female students. Also, 84 of them are from Samarahan with gender

composition of 30 male students and 54 female students. Kuching was classified as the Red Zone due to the high number of cases on the 31st of March 2020 (97 cases), the 7th of April 2020 (182 cases) and the 14th of April 2020 (240 cases).

Whereas the Sabah Zone and the Federal Territory of Labuan are the second largest state of origins of the students in this faculty. A total of 217 students have enrolled in this faculty with gender composition of 63 male students and 154 female students. By district, 28 of the students come from Tawau with gender composition of 10 male students and 18 female students. On the last day of the First Phase of MCO, the number of COVID-19 positive cases in Tawau increased to 63 cases and Tawau was then immediately classified as the Red Zone. The number of positive cases kept increasing to 67 cases on the 7th of April 2020 and next became 79 cases on the 14th of April 2020.

Furthermore, 216 of the students from this faculty are also from the Northern Zone with gender composition of 43 male students and 107 female students. By district, 29 of them are originated from Kinta with gender composition of 6 male students and 23 female students. Kinta was classified as the Red Zone with 77 cases on the 31st of March 2020. The number increased to 93 cases on the 7th of April 2020 and remained static until the 14th of April 2020. Besides Kinta, Hulu Perak was also categorized as the Red Zone with 57 cases on the 31st of March 2020 and the number increased to 65 cases on the 7th of April 2020 (Map 127 until Map 144).

In place of Faculty of Cognitive Sciences and Human Development (FCSHD), the total number of students in this faculty is

1,588 with gender composition of 343 male students and 1,214 female students (Table 9). Of the total number of students, 596 are from the Sarawak Zone with gender composition of 125 male students and 471 female students. By district, 199 of them do come from Kuching with gender composition of 40 male students and 159 female students. Next, 72 of the students are originated from Samarahan with gender composition of 16 male students and 56 female students. Kuching was classified as the Red Zone with 97 cases on the 31st of March 2020 and followed by 240 cases on the 7th of April 2020. Samarahan was also categorized as the Red Zone with 42 cases on the 7th of April and 51 cases on the 14th of April 2020.

Also, 312 of the students from this faculty come from the Southern Zone with gender composition of 50 male students and 262 female students. By district, 76 of the students come from Johor Bahru with gender composition of 8 male students and 68 female students. Next, 58 of them are originated from Seremban with gender composition of 10 male students and 48 female students. Both were classified as the Red Zone because Johor Bahru recorded 184 cases on the 14th of April 2020 while Seremban recorded 261 cases on the 14th of April 2020 (Map 145 until Map 162).

For Faculty of Resource Science and Technology (FRST), the total number of students is 1,318 with gender composition of 370 male students and 948 female students (Table 10). Of the total number, 181 of male students and 496 female students are originated from the Sarawak Zone. Most of the students come from Kuching (237), Miri (65), Sibu (58) and Samarahan (57). Too, 143 of the students come from the Northern Zone with gender composition of

46 male students and 97 female students. There were two (2) Red Zone of the COVID-19 cases namely Hilir Perak and Kinta with their respective cases of 66 and 93 on the 14th of April 2020. Subsequently, 139 of the students come from the Central Zone with gender composition of 46 male students and 97 female students. 40 of the students come from the Federal Territory of Kuala Lumpur, 30 are from Petaling and 27 are from Hulu Langat. On the 14th of April 2020, the Federal Territory of Kuala Lumpur recorded the highest COVID-19 cases (899) followed by Hulu Langat (433), Petaling (359), Klang (167) and Gombak (141). (Map 163 until Map 180).

For Faculty of Applied and Creative Arts (FACA), the total number of students is 1,140 with gender composition of 417 male students and 723 female students (Table 11). Of the total number of students, 455 of them come from the Sarawak Zone with gender composition of 168 male students and 287 female students. While 286 of the students are originated from the Southern Zone with gender composition of 92 male students and 144 female students. In the Sarawak Zone, there were two (2) Red Zone of the COVID-19 cases, namely Kuching and Samarahan. Whereas in the Southern Zone, there were 8 Red Zone of COVID-19 cases namely Rembau, Seremban, Jasin, Melaka Tengah, Batu Pahat, Johor Bahru, Kluang and Muar (Map 181 until Map 198).

For Faculty of Language and Communication (FLC), the total number of students is 427 with gender composition of 101 male students and 326 female students (Table 12). Of the total number of students, 260 of them come from the Sarawak Zone with gender composition of 62 male students and 198 female students. By district,

86 of the students come from Kuching with gender composition of 17 male students and 69 female students. In addition, 22 of the students are from Miri with gender composition of 4 male students and 18 female students. There are 16 students who come from Samarahan, which was classified as the Red Zone of the COVID-19 cases (Map 199 until Map 216).

Table 13 shows the total number of UNIMAS 2019/2020 Undergraduate Students from Faculty of Built Environment and National Coronavirus (COVID-19) cases by district and gender. In total, there are 148 students registered in this faculty with gender composition of 48 male students and 100 female students.

Of the total students, 106 of them do come from the Sarawak Zone with gender composition of 34 male students and 72 female students. In the Sarawak Zone, Kuching and Samarahan were listed as the Red Zone of the COVID-19 cases. In the Central Zone, Kinta was also listed as the Red Zone with 77 cases on the 31st of March 2020 and 93 cases on the 14th of April 2020. Besides, Hulu Langat and Hulu Selangor were also the Red Zone. Hulu Langat recorded 75 cases on the 21st of March 2020, 265 cases on the 31st of March 2020, 345 cases on the 7th of April 2020 and 433 cases on the 14th of April 2020. Meanwhile, in the Southern Zone, Johor Bahru was the only district classified as the Red Zone of the COVID-19 cases. For the East Coast Zone, Kuantan was the only district labeled as the Red Zone with 91 cases recorded on the 17th of April 2020. Meanwhile, there was no Red Zone in Sabah and the Federal Territory of Labuan (Map 217 until Map 234).

Table 14 shows the total number of UNIMAS 2019/2020 Undergraduate Students from Faculty of Computer Science and Information Technology and National Coronavirus (COVID-19) cases by district and gender. In total, there are 1,353 students registered under this faculty with gender composition of 678 male students and 675 female students.

Of the total number of students, 698 of them come from the Sarawak Zone with gender composition of 392 male students and 306 female students. From that, 247 of the students are originated from Kuching, 89 are from Samarahan and 69 are from Sibu. Kuching and Samarahan were labeled as the Red Zone with 240 cases and 51 cases respectively on the 14th of April 2020.

Next, 169 of the students do come from the Northern Zone with gender composition of 78 male students and 91 female students. From that, 39 of the students are originated from Kinta with gender composition of 20 male students and 19 female students. Kinta recorded 77 cases on the 31st of March 2020 and the figure increased to 93 cases on the 14th of April 2020.

Subsequently, 127 of the students do come from the Central Zone with gender composition of 58 male students and 69 female students. From the Southern Zone, 34 of the students do originate from Petaling with gender composition of 15 male students and 19 female students. Petaling recorded 96 cases on the 21st of March 2020, 234 cases on the 31st of March 2020, 306 cases on the 7th of April 2020 and 359 cases on the 14th of April 2020 (Map 235 until Map 252).

As illustrated in the monograph, the insight behind leads people to two (2) crucial options of risk mitigation decisions for resuming the university operations, which are; i) traveling back to campus plan and ii) non-traveling back to campus plan after the end of Movement Control Order (MCO). For the first option of traveling back to campus plan, universities need to be precisely and cautiously aware of the risk transmission in different cross-site social interactions, traveling and geographical settings (Liu *et al.*, 2020). According to Gallagher (2020), human mobility or travel movement will be a serious disadvantage in slowing potential pandemic and there is a potential risk to become a super spreader, infecting many people across an expansive geographical area. Thus, a detailed understanding of the geographical distribution across contact (e.g. human, transportation type, equipment), context (e.g. faculty, gender and education level), space (locations) and time (Centre of Diseases Control and Prevention, 2020; Boulos and Geraghty 2020); will be able to provide an effective pandemic monitoring and risk management plan for the universities. Segregation of the travel plan between the Red, Yellow and Green Areas together with proper screening of travelers at international and domestic airports, bus stations and ports should be undertaken to limit the risk of importing infection to campus.

Above and beyond, universities can also consider non-traveling back to campus plan after the end of MCO to resume their operations as the other options of mitigation strategy to deal with the second wave import and export infections. Besides cultivating the new norms such as social distancing, quarantine and high hygiene practices; travel restrictions can be effective in the intervention of

infectious disease spread. There are two (2) mechanisms under the travel restriction decision, which are i) Using online teaching and learning and ii) Utilizing nearest university facilities (Cross-sharing resources). Although universities across the globe have been forced to switch to online learning and digital tools, the level of student and lecturer readiness and acceptance is still vague and ambiguous. Based on QS 2020 survey report, 42% stated that they had no interest in studying online. Therefore, the strategic decision of universities cross-sharing resources to support student learning is maybe one of the ways (*solution*) to increase the level of readiness and acceptance of online learning. For instance, the student can enter the nearest universities and able to use networks and other facilities to support their learning process. However, this strategy needs proper coordination among universities that can be led by the ministries and authorities. Furthermore, the new network location and improvement of the bandwidth decision also be strategized according to student-universities' geographical location as illustrated in the monograph for optimization objective.

A different proactive management effort such as communication and training measures is also important for prevention and risk mitigation of COVID-19 as suggested by International Labour Organization 2020. Basically, the real solution to this pandemic is about adapting to the new norms and behavioral change. Universities play a vital role to educate people as much as possible, so that the First Class Human Capital for our country remains treasured. Providing training to the university staff and students on the measures adopted to prevent the risk of exposure to the virus and on how to deal with COVID-19 infection can also be a

smart move. Both communication and training efforts are crucial to help universities in managing psychological risk that might be faced by staff and students.

The current COVID-19 pandemic faced by almost everybody has fundamentally changed the behaviors and habits of individuals in their daily life. Physically and mentally. The change of the common cultural practice has turned to something new, even the nature of culture itself should be learned, adaptive and shared by members of the community. In order to address the significant influences as well as effects from the spreading of COVID19 outbreak, social interaction between human with human have become a focal point of discussion. The dispersion of this pandemic is supported by the degree of social interaction between individuals and it is clear that the implementation of new norms is now a necessity. From sociological and geographical point of view, this monograph shows the individual's relationship to the locality and the degree of COVID19 distribution in the social environment.

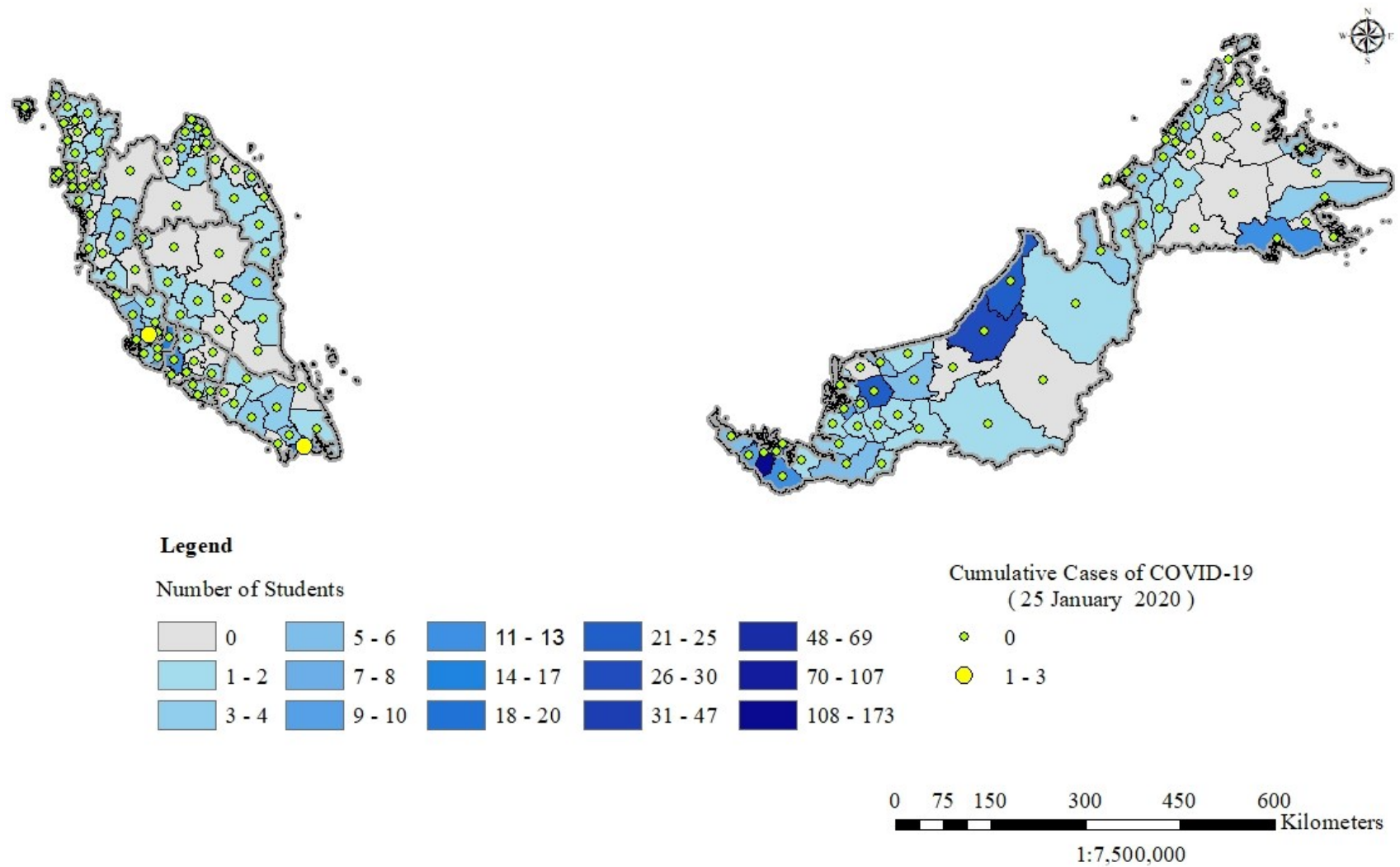
6.0 Conclusion

This monograph is in line with the government's efforts to monitor and prevent the COVID-19 from widely spreading in the community by using the mapping technique as an initial screening of students based on their origin and location. Correspondingly, this monograph also emphasizes the use of GIS in the field of epidemiology and spatial analysis, particularly in looking at the distribution of people and infectious diseases. The paradigm of

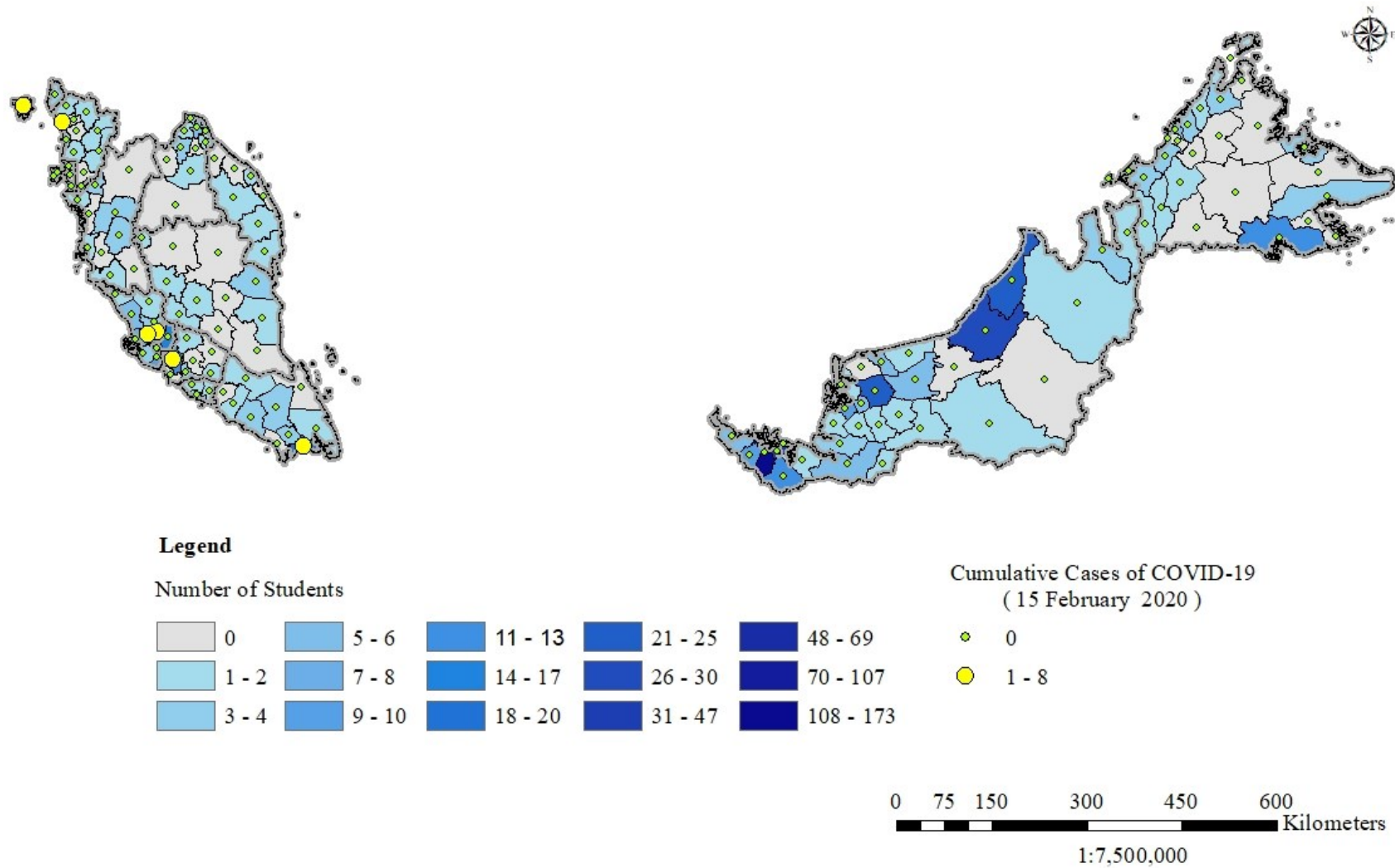
reliance on maps and analog data in assessing the spatial patterns and the effects of pandemics involving spatial data can be improved in the future. This monograph will also be improved in terms of risk management to enhance the ability of adaptation, forecasting and more comprehensive contextual understanding to help in shaping the university's post-COVID-19 action plan.

In conclusion, all universities should lead suitable and flexible ways in showing a calm and measured approach to crisis management while remained decisive and effective without minimizing or dismissing credible risks. Conduct a full risk assessment for every location, decisions and keep it constantly updated to reflect any changes on the ground may also be helpful. It is all about good prevention and smart management.

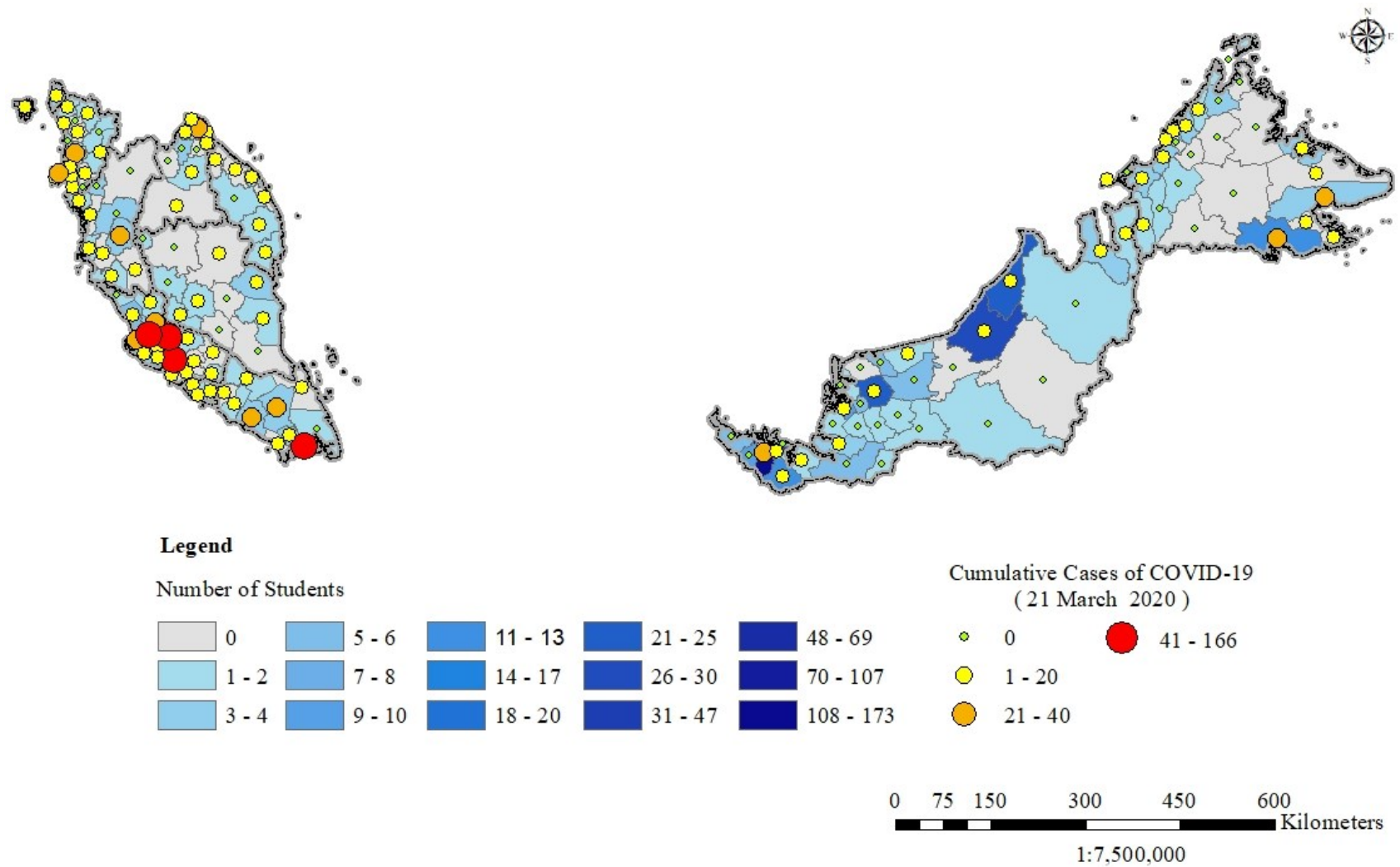
Map 1: Spatial Distribution of UNIMAS 2019/2020 Pre-University Students and National Coronavirus (COVID-19) Cases on the 25th of January 2020



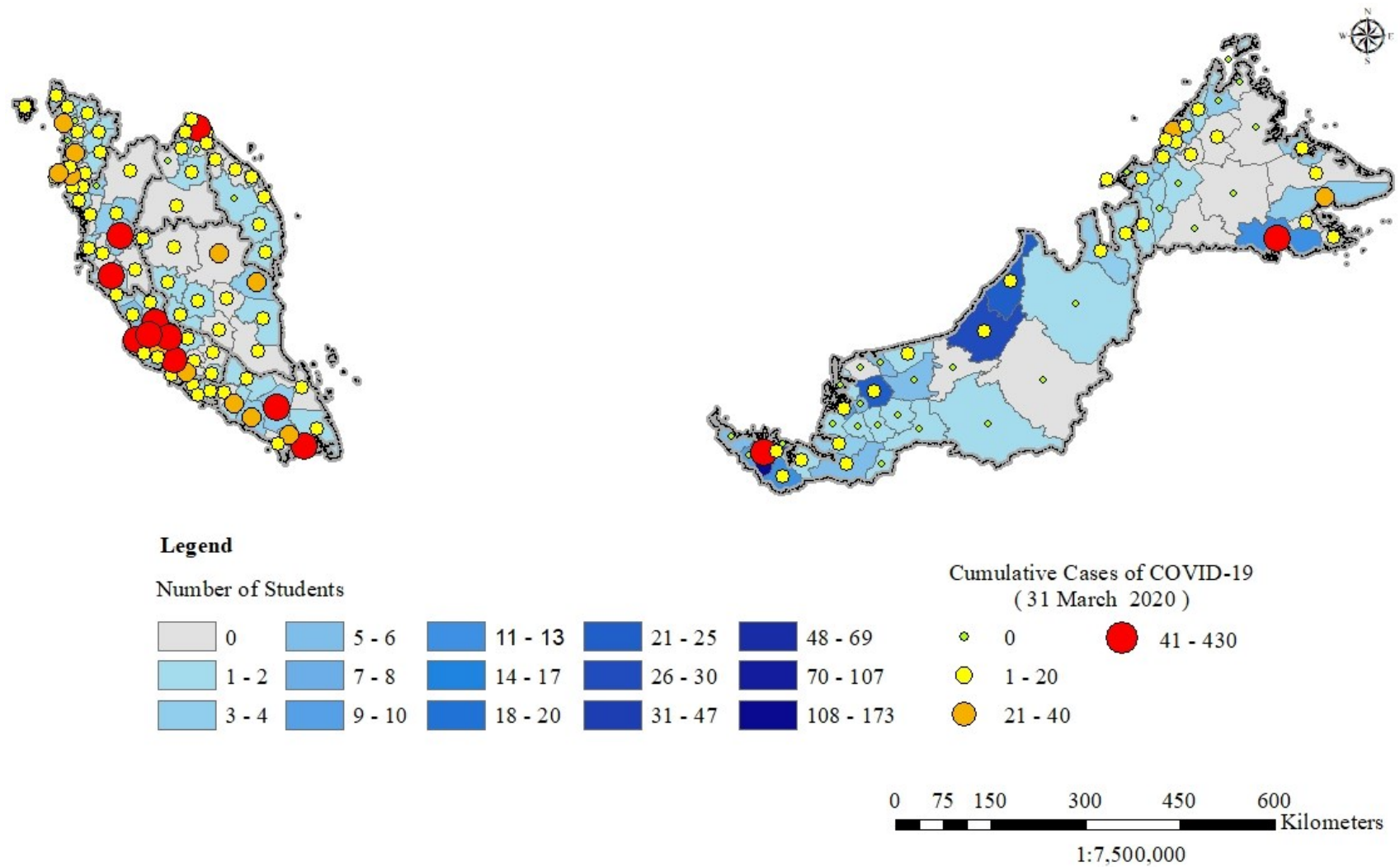
Map 2: Spatial Distribution of UNIMAS 2019/2020 Pre-University Students and National Coronavirus (COVID-19) Cases on the 15th of February 2020



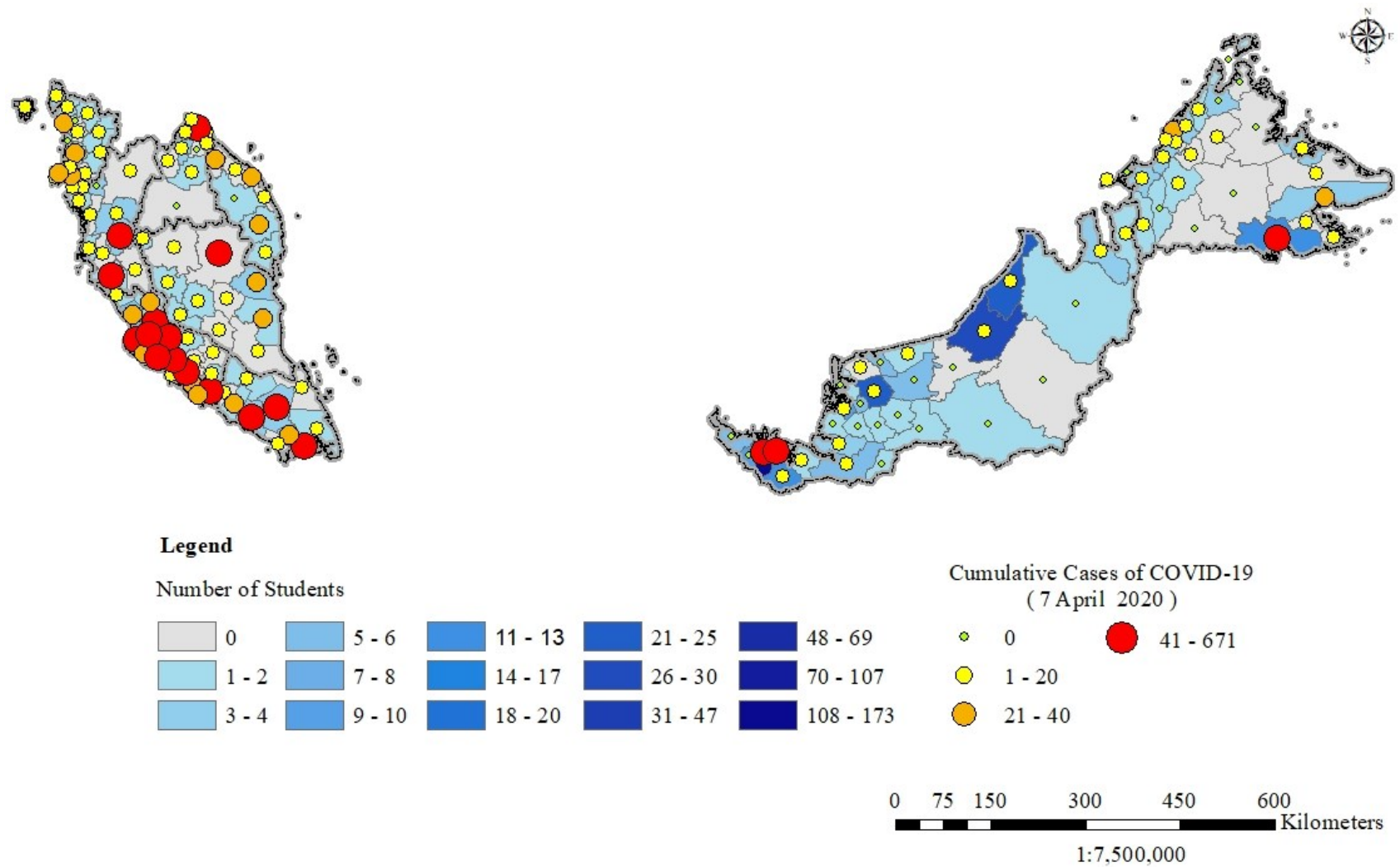
Map 3: Spatial Distribution of UNIMAS 2019/2020 Pre-University Students and National Coronavirus (COVID-19) Cases on the 21st of March 2020



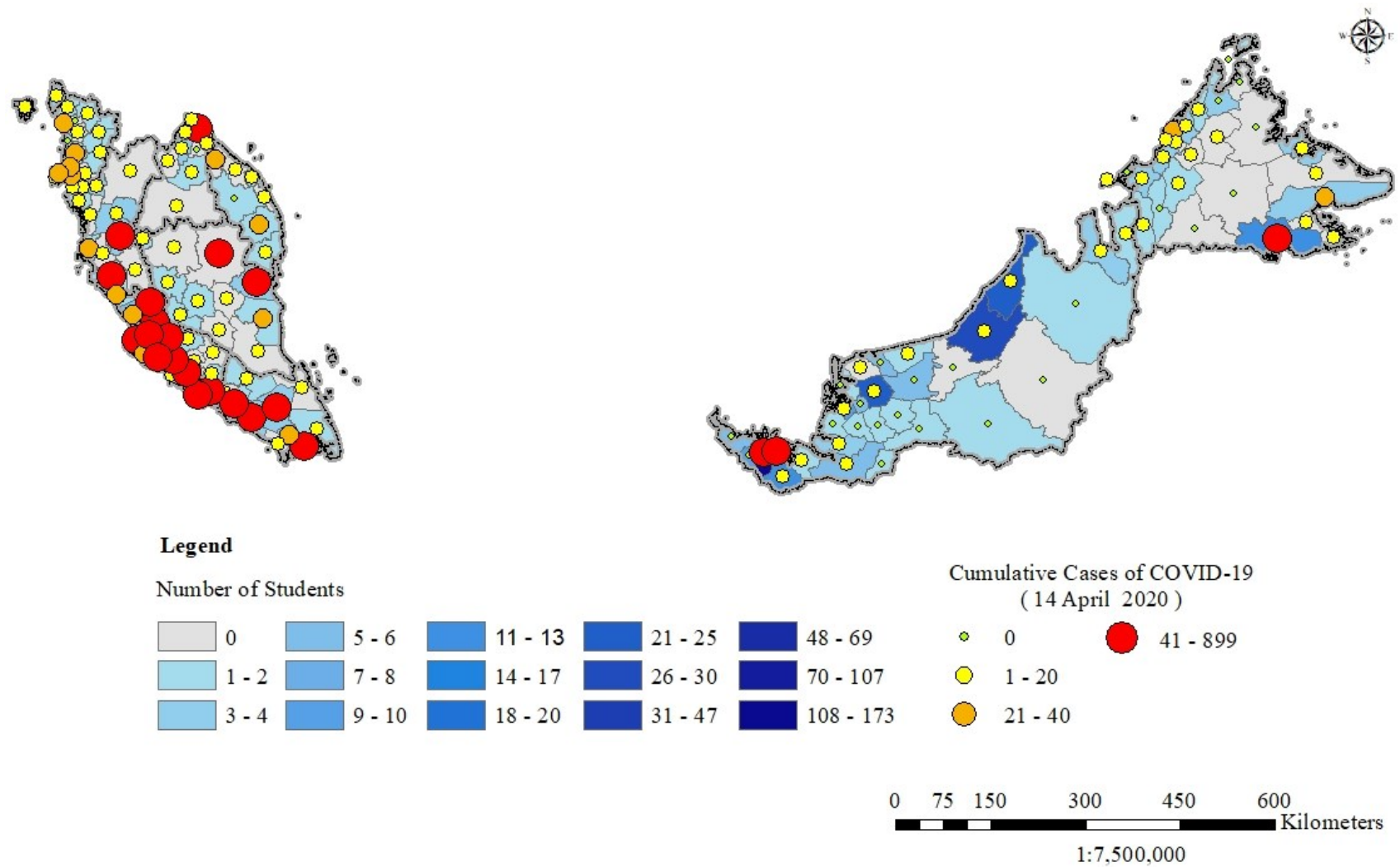
Map 4: Spatial Distribution of UNIMAS 2019/2020 Pre-University Students and National Coronavirus (COVID-19) Cases on the 31st of March 2020



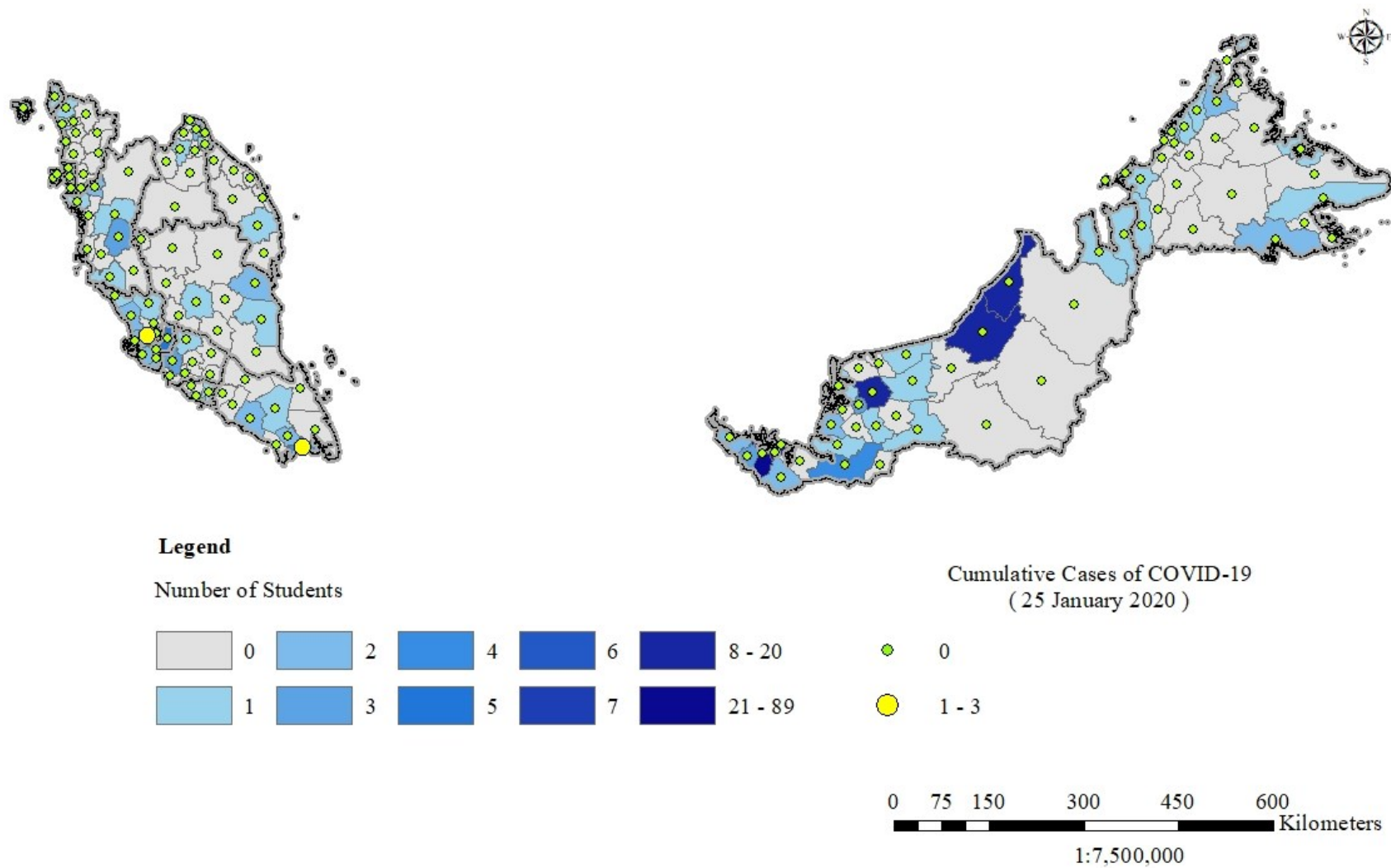
Map 5: Spatial Distribution of UNIMAS 2019/2020 Pre-University Students and National Coronavirus (COVID-19) Cases on the 7th of April 2020



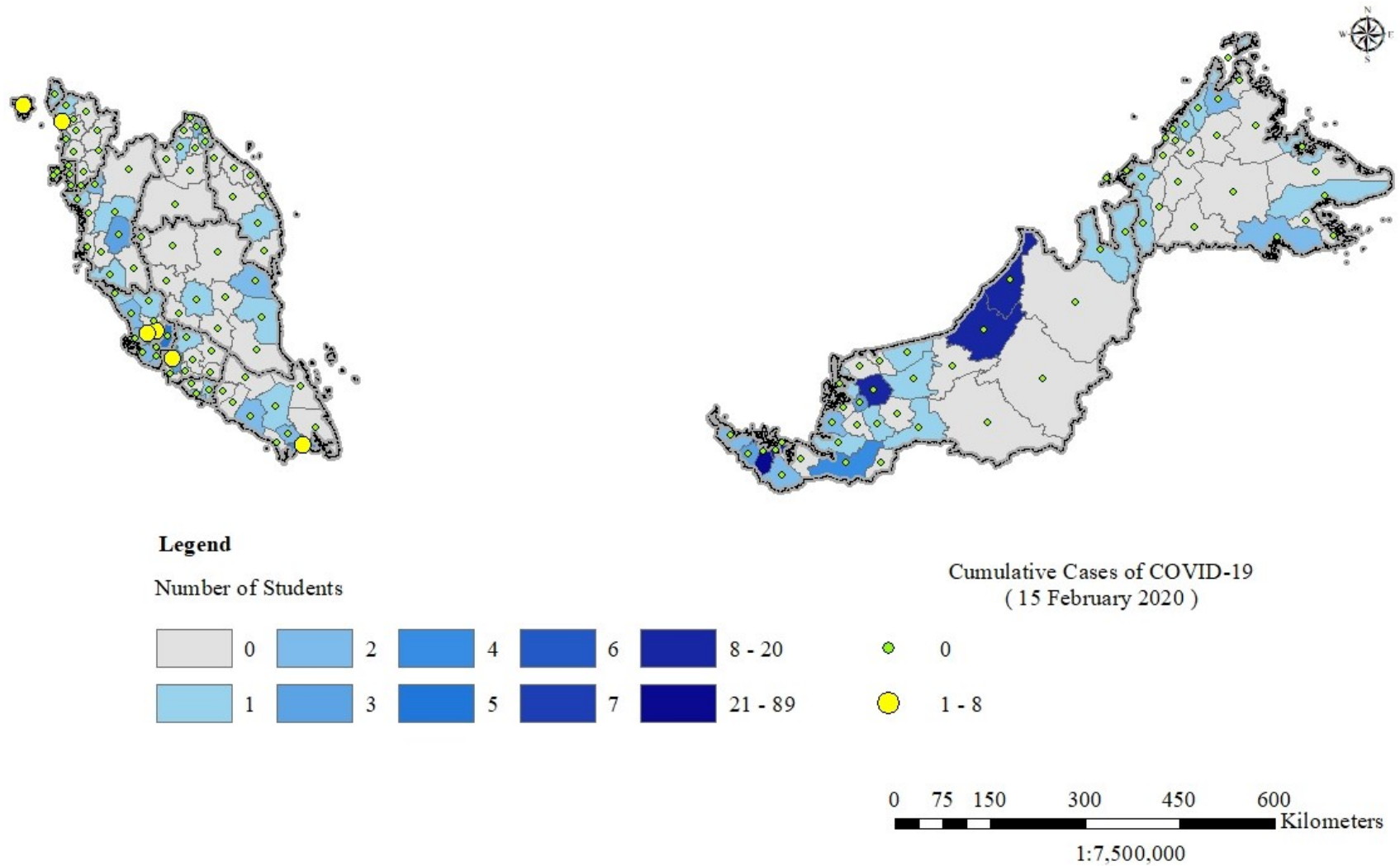
Map 6: Spatial Distribution of UNIMAS 2019/2020 Pre-University Students and National Coronavirus (COVID-19) Cases on the 14th of April 2020



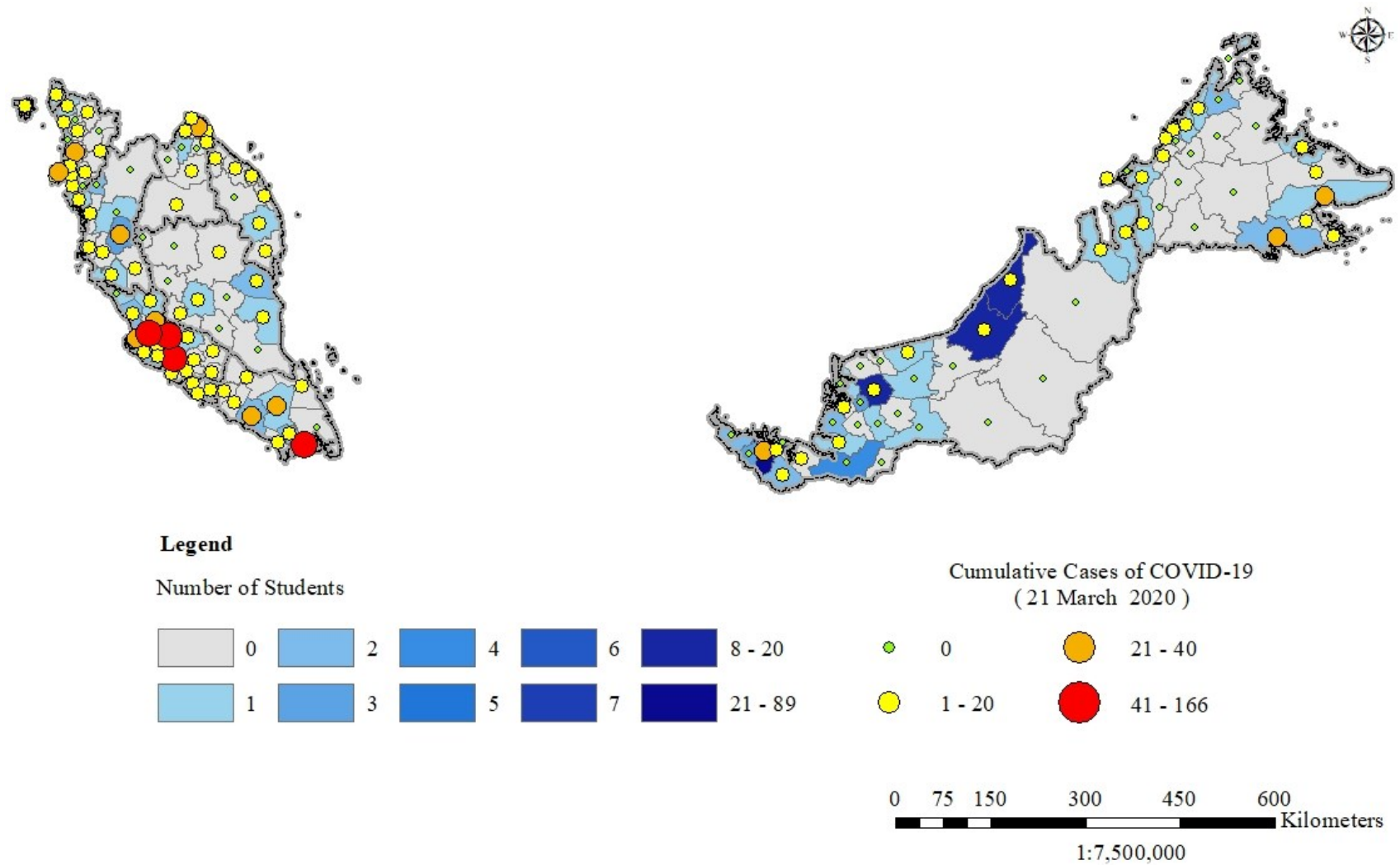
Map 7: Spatial Distribution of UNIMAS 2019/2020 Male Pre-University Students and National Coronavirus (COVID-19) Cases on the 25th of January 2020



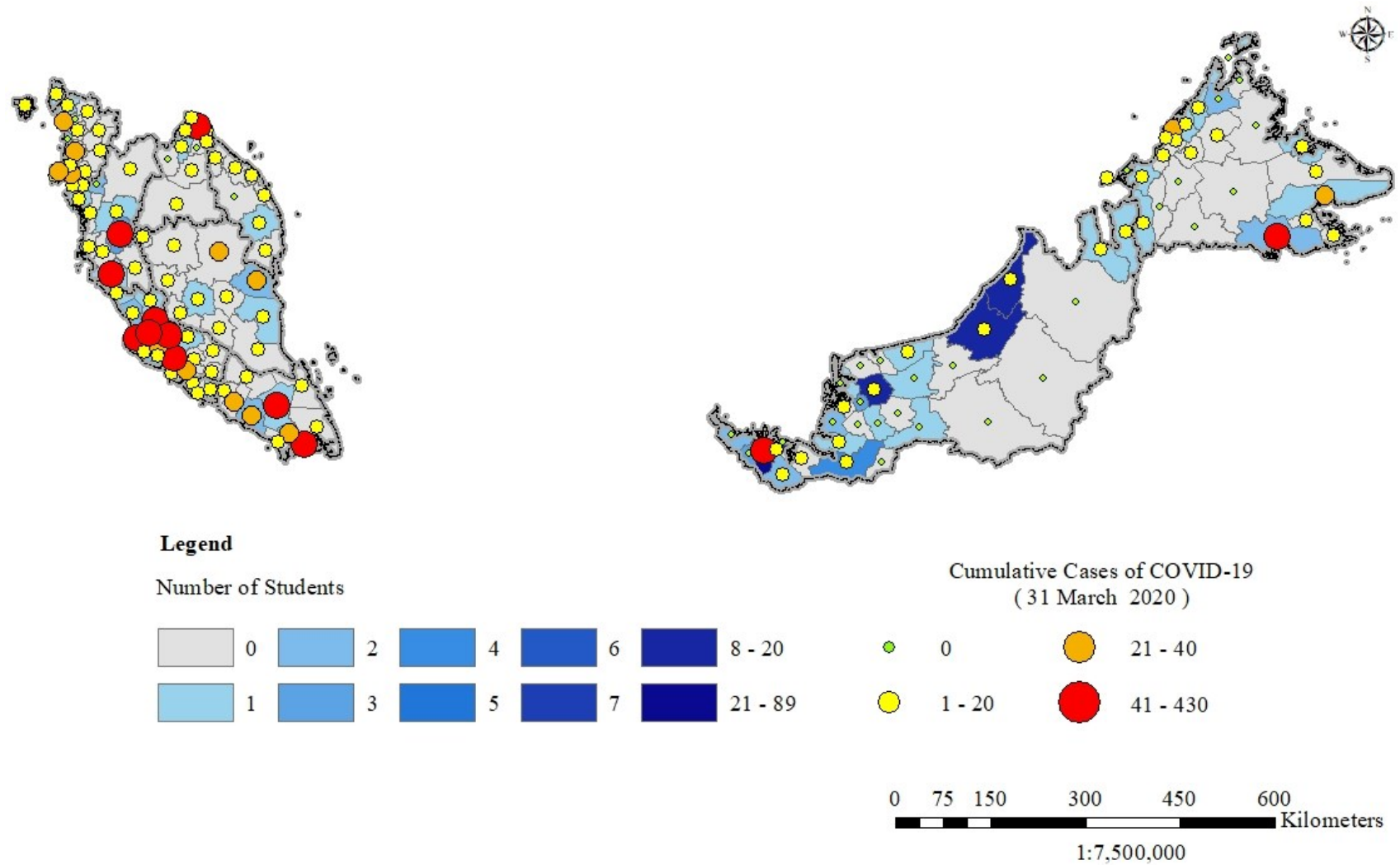
Map 8: Spatial Distribution of UNIMAS 2019/2020 Male Pre-University Students and National Coronavirus (COVID-19) Cases on the 15th of February 2020



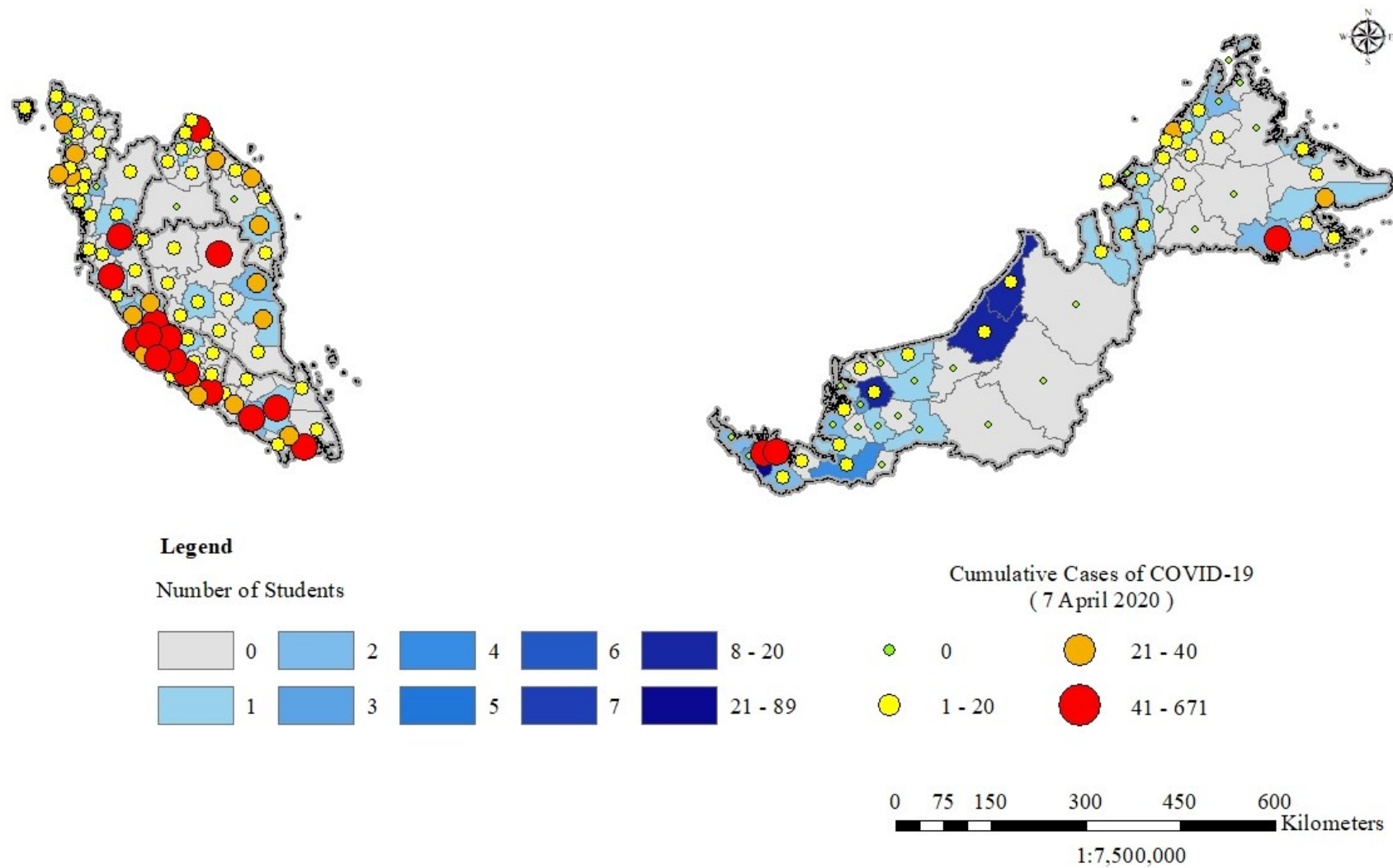
Map 9: Spatial Distribution of UNIMAS 2019/2020 Male Pre-University Students and National Coronavirus (COVID-19) Cases on the 21st of March 2020



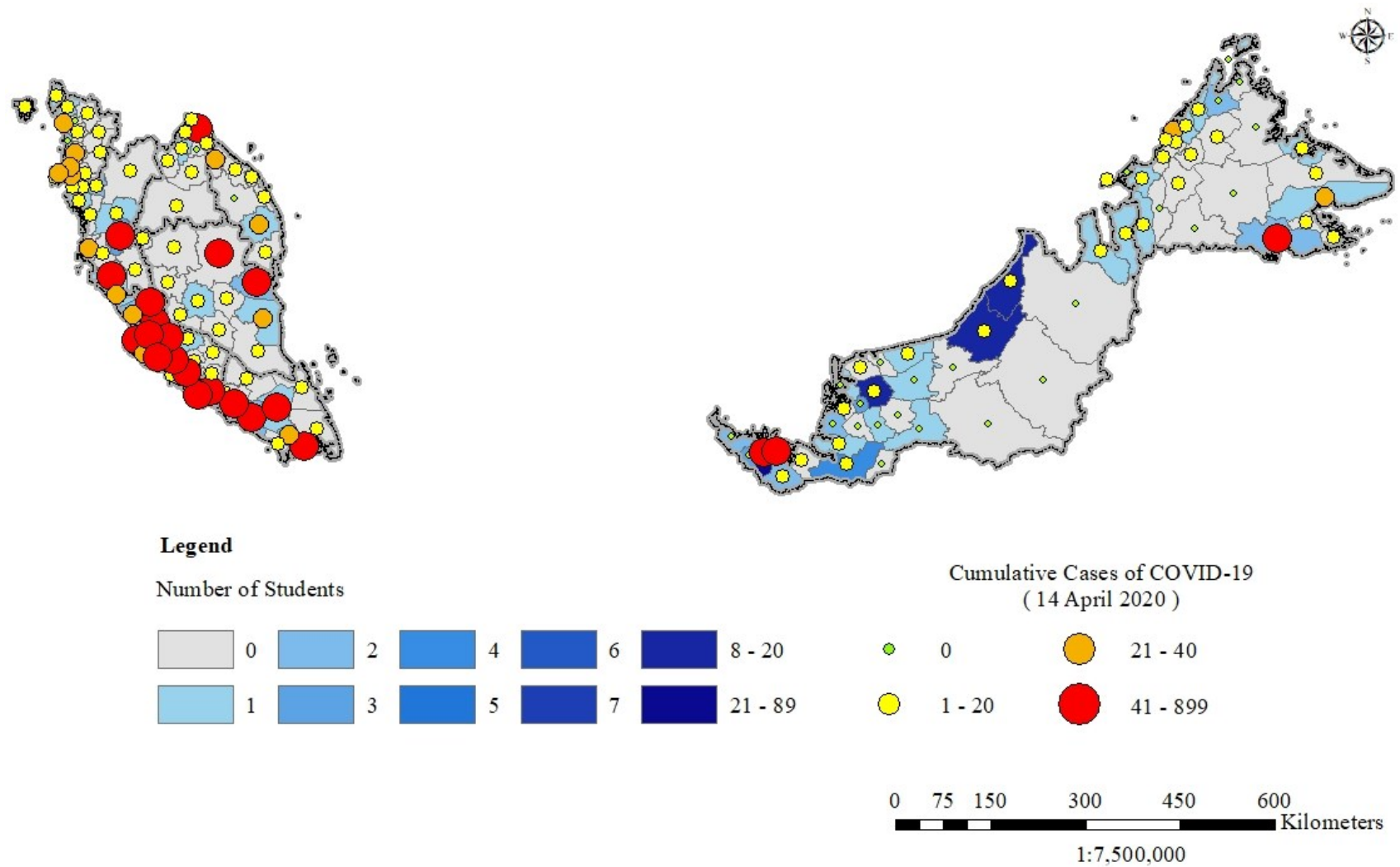
Map 10: Spatial Distribution of UNIMAS 2019/2020 Male Pre-University Students and National Coronavirus (COVID-19) Cases on the 31st of March 2020



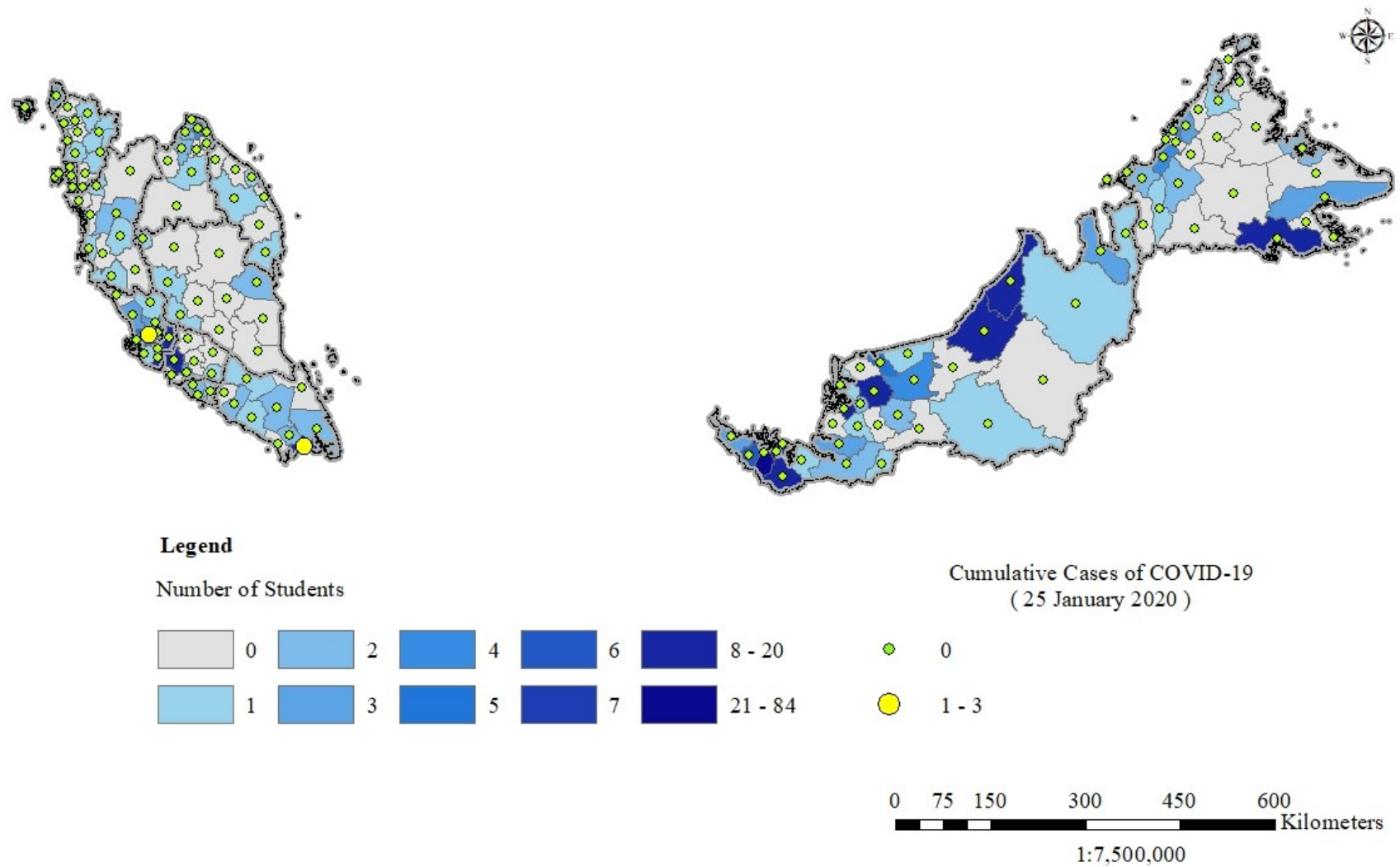
Map 11: Spatial Distribution of UNIMAS 2019/2020 Male Pre-University Students and National Coronavirus (COVID-19) Cases on the 7th of April 2020



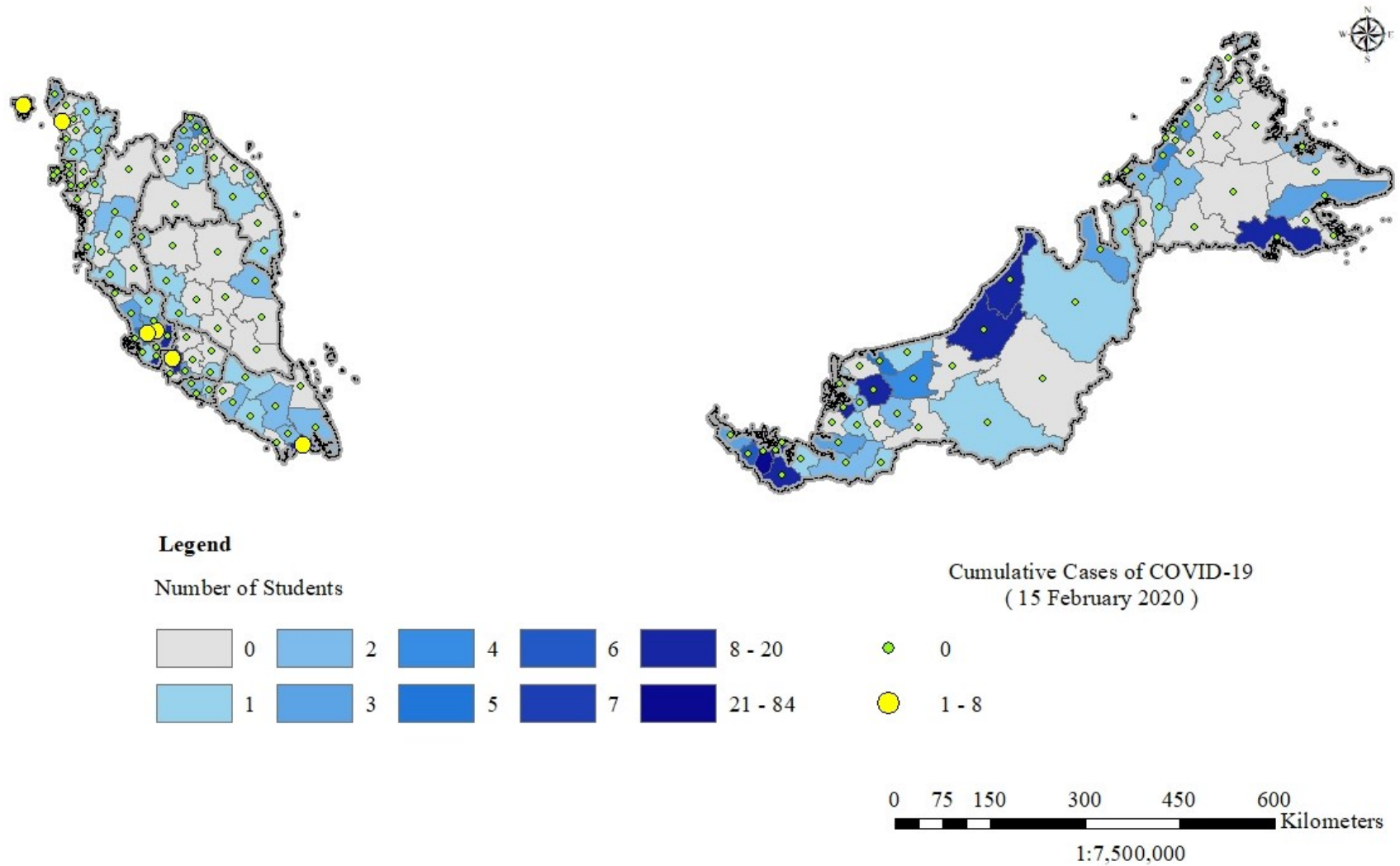
Map 12: Spatial Distribution of UNIMAS 2019/2020 Male Pre-University Students and National Coronavirus (COVID-19) Cases on the 14th of April 2020



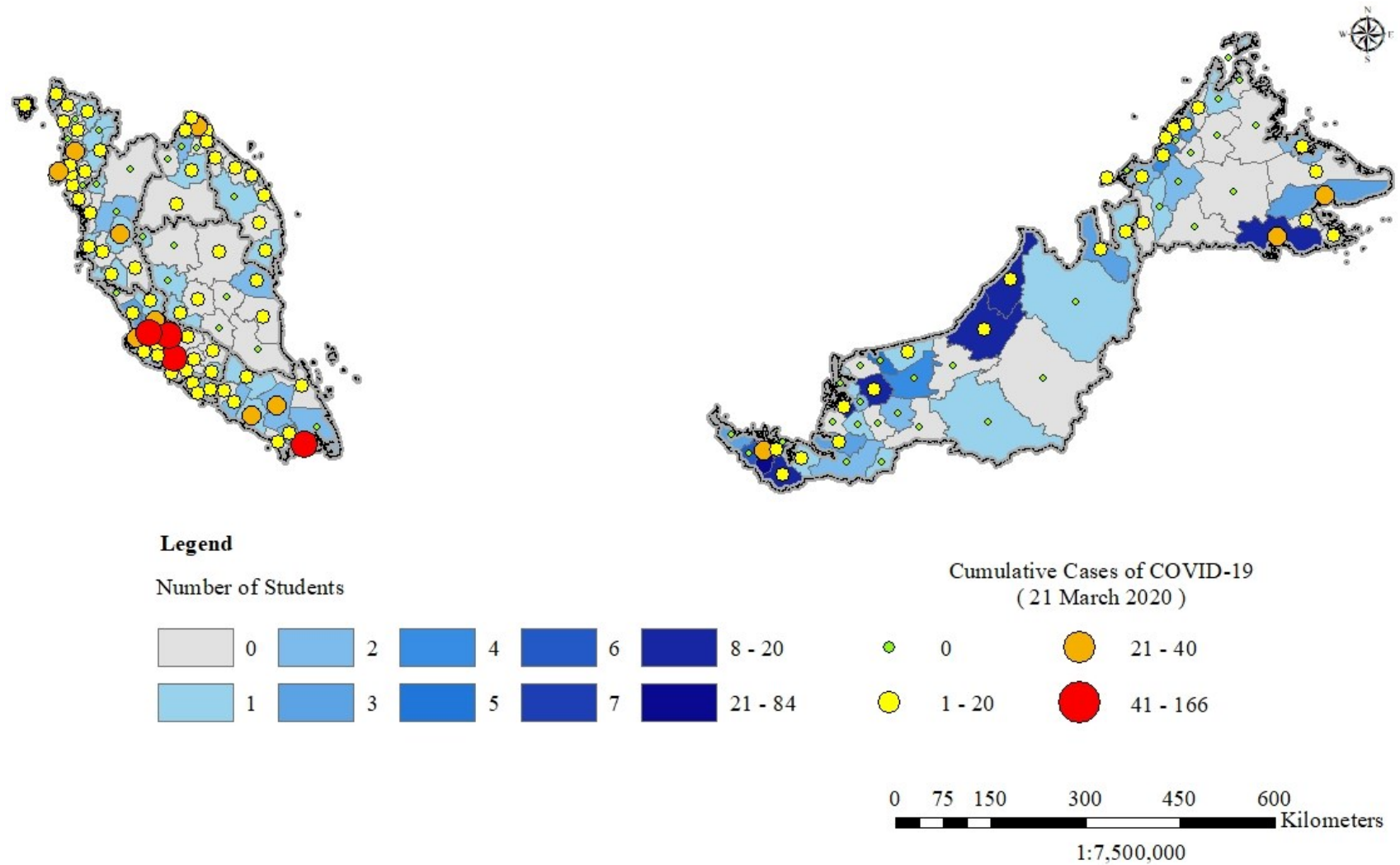
Map 13: Spatial Distribution of UNIMAS 2019/2020 Female Pre-University Students and National Coronavirus (COVID-19) Cases on the 25th of January 2020



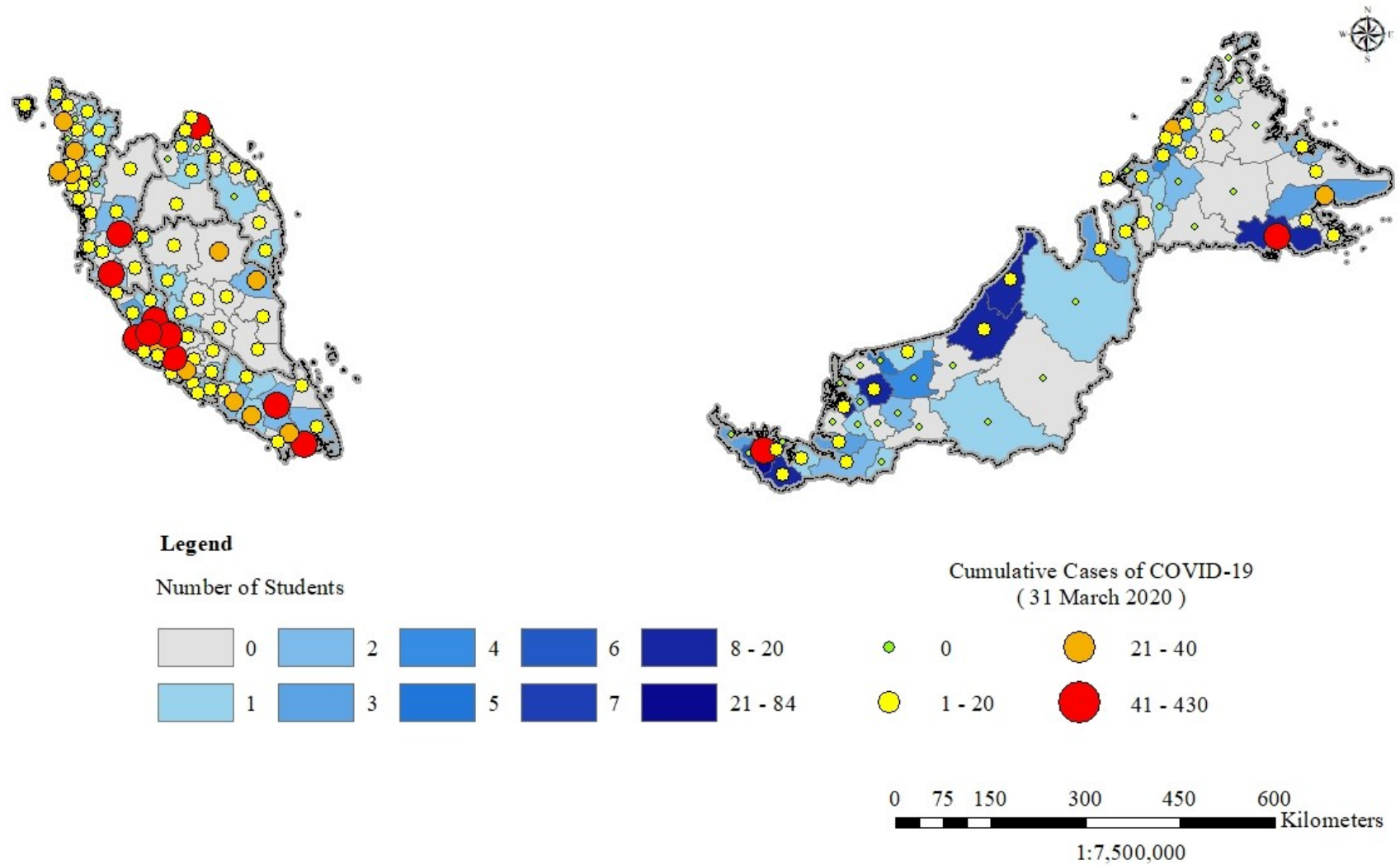
Map 14: Spatial Distribution of UNIMAS 2019/2020 Female Pre-University Students and National Coronavirus (COVID-19) Cases on the 15th of February 2020



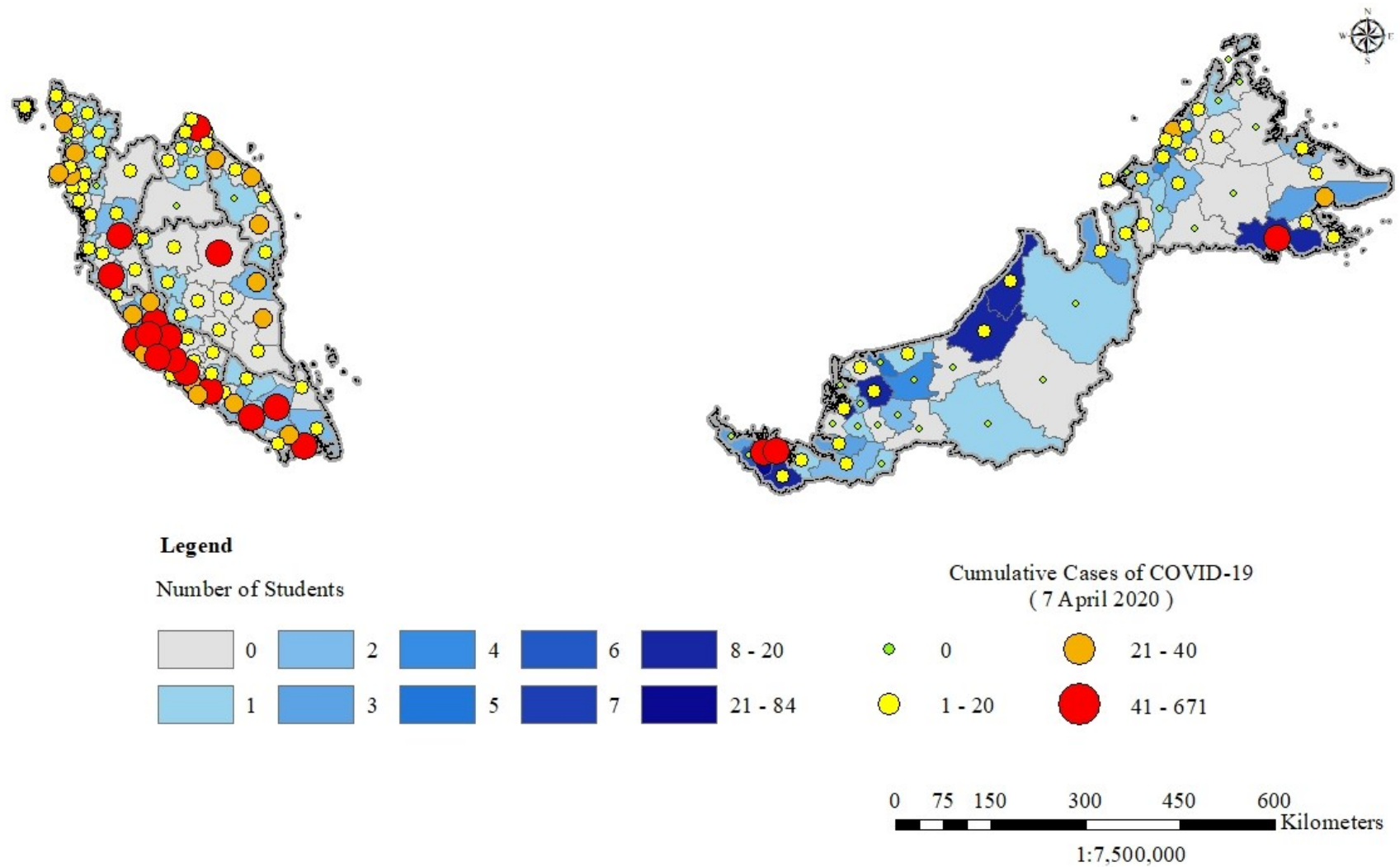
Map 15: Spatial Distribution of UNIMAS 2019/2020 Female Pre-University Students and National Coronavirus (COVID-19) Cases on the 21st of March 2020



Map 16: Spatial Distribution of UNIMAS 2019/2020 Female Pre-University Students and National Coronavirus (COVID-19) Cases on the 31st of March 2020



Map 17: Spatial Distribution of UNIMAS 2019/2020 Female Pre-University Students and National Coronavirus (COVID-19) Cases on the 7th of April 2020



Map 18: Spatial Distribution of UNIMAS 2019/2020 Female Pre-University Students and National Coronavirus (COVID-19) Cases on the 14th of April 2020

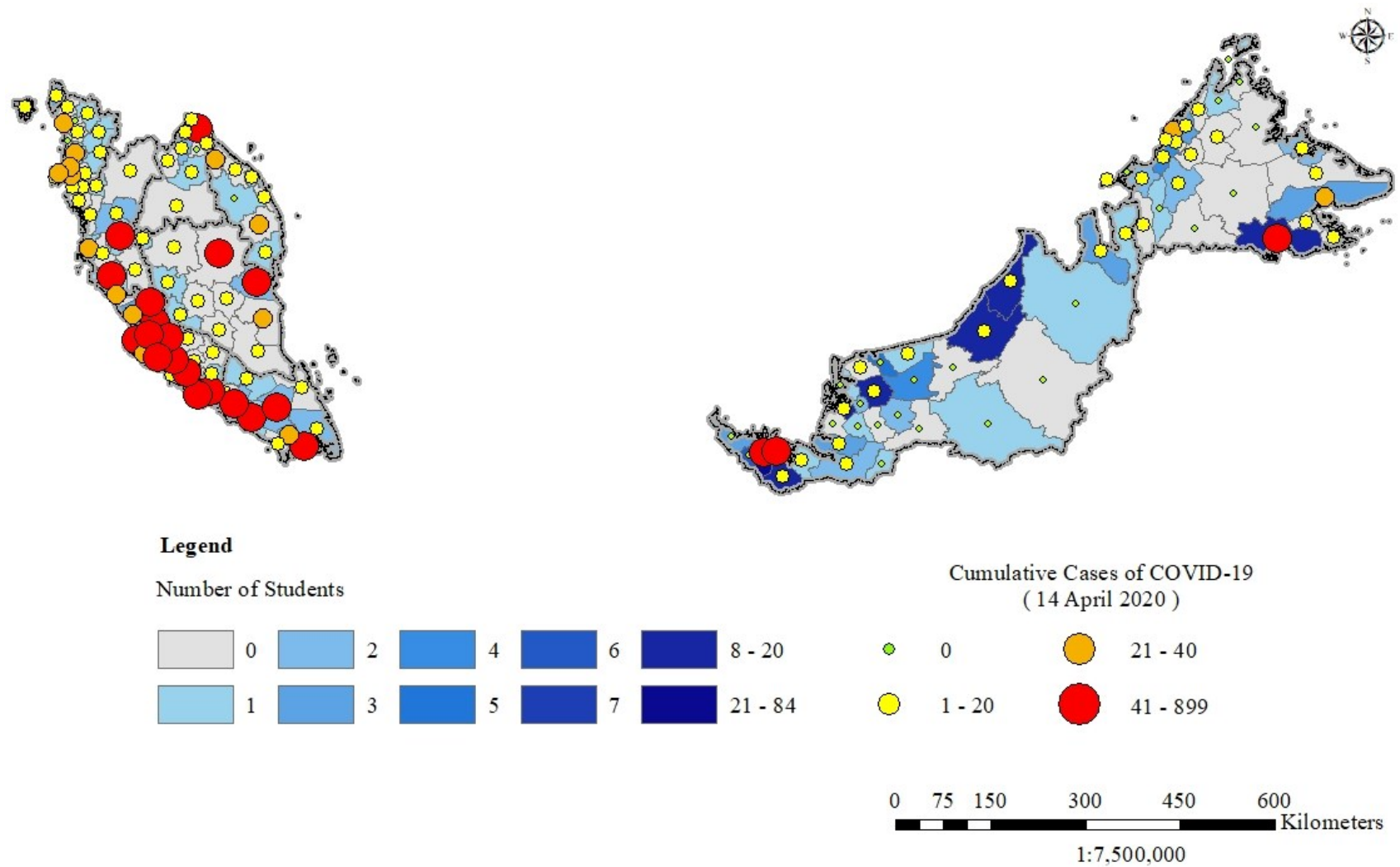


Table 1: Total of UNIMAS 2019/2020 Pre-University Students and National Coronavirus (COVID-19) Cases by District and Gender

Zone: North (Perlis, Kedah, Pulau Pinang and Perak)

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Perlis	Perlis	1	3	4	0	0	9	12	17	18
Kedah	Baling	0	1	1	0	0	1	1	1	1
Kedah	Bandar Baharu	0	0	0	0	0	1	1	1	1
Kedah	Kota Setar	1	1	2	0	2	10	22	26	26
Kedah	Kuala Muda	0	1	1	0	0	23	30	35	35
Kedah	Kubang Pasu	1	0	1	0	0	1	7	8	8
Kedah	Kulim	0	0	0	0	0	1	7	10	13
Kedah	Padang Terap	0	1	1	0	0	1	1	1	1
Kedah	Pendang	0	0	0	0	0	2	3	3	3
Kedah	Pokok Sena	0	0	0	0	0	0	0	0	0
Kedah	Sik	0	0	0	0	0	1	1	1	1
Kedah	Yan	1	0	1	0	0	0	0	0	0
Kedah	Langkawi	0	0	0	0	2	4	4	4	4
Pulau Pinang	Daerah Barat Daya	1	0	1	0	0	0	9	11	13
Pulau Pinang	Daerah Timur Laut	0	0	0	0	0	19	27	27	32
Pulau Pinang	Seberang Perai Utara	0	2	2	0	0	0	15	17	23
Pulau Pinang	Seberang Perai Tengah	0	0	0	0	0	16	32	37	40
Pulau Pinang	Seberang Perai Selatan	1	0	1	0	0	0	11	11	11
Perak	Hulu Perak	0	0	0	0	0	0	5	6	6
Perak	Kerian	1	0	1	0	0	7	13	16	19
Perak	Larut dan Matang	0	0	0	0	0	3	11	17	19
Total	21	7	9	16	0	4	99	212	249	274

Zone: Central Group 1 (Perak, Selangor, Kuala Lumpur and Putrajaya)

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Perak	Kuala Kangsar	1	2	3	0	0	0	2	2	4
Perak	Manjung	0	1	1	0	0	4	12	16	22
Perak	Kinta	3	1	4	0	0	21	77	93	93
Perak	Kampar	2	1	3	0	0	0	0	0	2
Perak	Perak Tengah	0	0	0	0	0	6	7	9	11
Perak	Hilir Perak	1	1	2	0	0	13	57	65	66
Perak	Batang Padang	0	0	0	0	0	1	5	8	9
Selangor	Gombak	0	3	3	0	0	38	62	111	141
Selangor	Hulu Langat	5	9	14	0	0	75	265	345	433
Selangor	Hulu Selangor	1	1	2	0	0	3	12	27	49
Selangor	Klang	2	5	7	0	0	23	74	123	167
Selangor	Kuala Langat	2	1	3	0	0	8	16	22	25
Selangor	Kuala Selangor	2	3	5	0	0	17	19	30	35
Selangor	Petaling	2	10	12	3	8	96	234	306	359
Selangor	Sabak Bernam	1	0	1	0	0	0	2	10	23
Selangor	Sepang	2	8	10	0	0	8	17	46	67
Federal Territory	Kuala Lumpur	2	4	6	0	4	166	430	671	899
Federal Territory	Putrajaya	0	2	2	0	0	9	26	43	54
Total	18	26	52	78	3	12	488	1317	1927	2459

Zone: Central Group 2 (Pahang, Negeri Sembilan and Melaka)

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Pahang	Bentong	0	1	1	0	0	4	6	11	15
Pahang	Bera	0	0	0	0	0	0	9	9	9
Pahang	Cameron Highlands	0	1	1	0	0	0	1	1	2
Pahang	Jerantut	0	0	0	0	0	7	27	61	70
Pahang	Kuantan	2	2	4	0	0	11	24	40	91
Pahang	Lipis	0	0	0	0	0	0	3	7	9
Pahang	Maran	0	0	0	0	0	0	5	6	6
Pahang	Pekan	1	0	1	0	0	13	20	23	23
Pahang	Raub	0	1	1	0	0	0	1	1	1
Pahang	Rompin	0	0	0	0	0	0	2	3	3
Pahang	Temerloh	1	0	1	0	0	2	4	5	7
Negeri Sembilan	Jelebu	1	0	1	0	0	1	1	1	2
Negeri Sembilan	Jempol	0	0	0	0	0	1	4	9	12
Negeri Sembilan	Kuala Pilah	0	0	0	0	0	1	3	4	35
Negeri Sembilan	Port Dickson	0	0	0	0	0	3	6	9	9
Negeri Sembilan	Rembau	0	3	3	0	0	10	33	47	53
Negeri Sembilan	Seremban	3	8	11	0	2	44	119	174	261
Negeri Sembilan	Tampin	0	1	1	0	0	10	16	17	19
Melaka	Alor Gajah	0	2	2	0	0	6	14	25	28
Melaka	Jasin	1	1	2	0	0	11	19	42	68
Melaka	Melaka Tengah	2	2	4	0	0	5	19	36	51
Total	21	11	22	33	0	2	129	336	531	774

Zone: East Coast (Kelantan and Terengganu)

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Kelantan	Bachok	0	1	1	0	0	7	10	11	11
Kelantan	Gua Musang	0	0	0	0	0	1	2	2	2
Kelantan	Jeli	0	0	0	0	0	0	0	2	2
Kelantan	Kota Bharu	2	4	6	0	0	29	80	85	90
Kelantan	Kuala Krai	0	1	1	0	0	8	10	11	11
Kelantan	Machang	0	0	0	0	0	0	0	0	0
Kelantan	Pasir Mas	0	2	2	0	0	9	10	10	11
Kelantan	Pasir Puteh	1	0	1	0	0	4	8	8	8
Kelantan	Tanah Merah	1	2	3	0	0	0	3	6	6
Kelantan	Tumpat	0	1	1	0	0	3	8	12	13
Terengganu	Besut	0	0	0	0	0	7	16	29	32
Terengganu	Dungun	1	0	1	0	0	5	8	27	37
Terengganu	Hulu Terengganu	0	1	1	0	0	0	0	0	0
Terengganu	Kemaman	0	1	1	0	0	1	3	4	5
Terengganu	Kuala Terengganu	0	1	1	0	0	12	18	21	22
Terengganu	Marang	0	0	0	0	0	1	1	2	2
Terengganu	Setiu	0	0	0	0	0	1	1	7	8
Total	17	5	14	19	0	0	88	178	237	260

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Johor	Batu Pahat	2	1	3	0	0	23	39	48	51
Johor	Johor Bahru	4	16	20	0	4	52	112	146	184
Johor	Kluang	1	2	3	0	0	26	107	174	201
Joho	Kota Tinggi	0	2	2	0	0	0	12	14	19
Johor	Kulai	2	2	4	0	0	5	23	24	38
Johor	Ledang	0	0	0	0	0	3	5	7	14
Johor	Mersing	0	0	0	0	0	1	3	4	4
Johor	Muar	0	2	2	0	0	13	27	35	44
Johor	Pontian	0	0	0	0	0	3	12	14	17
Johor	Segamat	0	1	1	0	0	1	9	12	15
Total	10	9	26	35	0	4	127	349	478	587

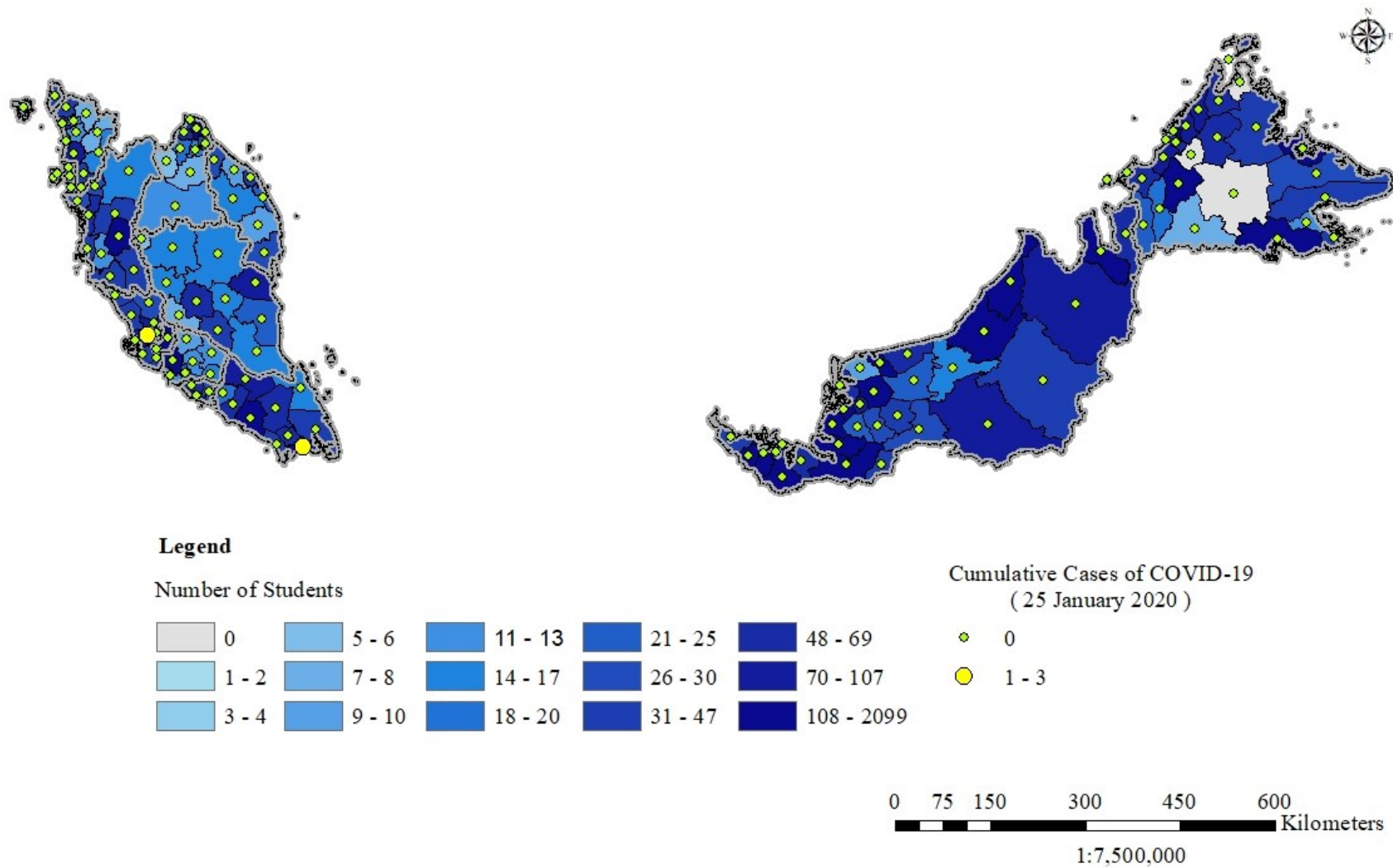
Zone: Sabah and Labuan

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Federal Territory	Labuan	1	3	4	0	0	5	12	13	15
Sabah	Beaufort	1	2	3	0	0	6	7	9	10
Sabah	Beluran	0	0	0	0	0	0	0	0	0
Sabah	Keningau	0	2	2	0	0	0	0	1	11
Sabah	Kinabatangan	0	0	0	0	0	11	14	17	19
Sabah	Kota Belud	1	0	1	0	0	5	5	5	5
Sabah	Kota Kinabalu	2	4	6	0	0	17	29	34	40
Sabah	Kota Marudu	2	1	3	0	0	0	0	0	0
Sabah	Kuala Penyu	0	0	0	0	0	0	0	0	0
Sabah	Kudat	1	1	2	0	0	0	0	0	0
Sabah	Kunak	0	0	0	0	0	5	7	8	8
Sabah	Lahad Datu	1	3	4	0	0	32	35	38	39
Sabah	Nabawan	0	0	0	0	0	0	0	0	0
Sabah	Papar	0	4	4	0	0	1	2	3	4
Sabah	Penampang	0	0	0	0	0	0	1	6	11
Sabah	Pitas	0	0	0	0	0	0	0	0	0
Sabah	Putatan	1	0	1	0	0	3	7	8	8
Sabah	Ranau	0	0	0	0	0	0	2	2	2
Sabah	Sandakan	1	2	3	0	0	8	16	19	20
Sabah	Semporna	0	0	0	0	0	1	1	2	2
Sabah	Sipitang	1	0	1	0	0	4	4	4	4
Sabah	Tambunan	0	0	0	0	0	0	1	1	3
Sabah	Tawau	2	9	11	0	0	37	63	67	79
Sabah	Tenom	0	1	1	0	0	0	0	0	0
Sabah	Tongod	0	0	0	0	0	0	0	0	0
Sabah	Tuaran	1	3	4	0	0	6	12	17	20
Total	26	15	35	50	0	0	141	218	254	300

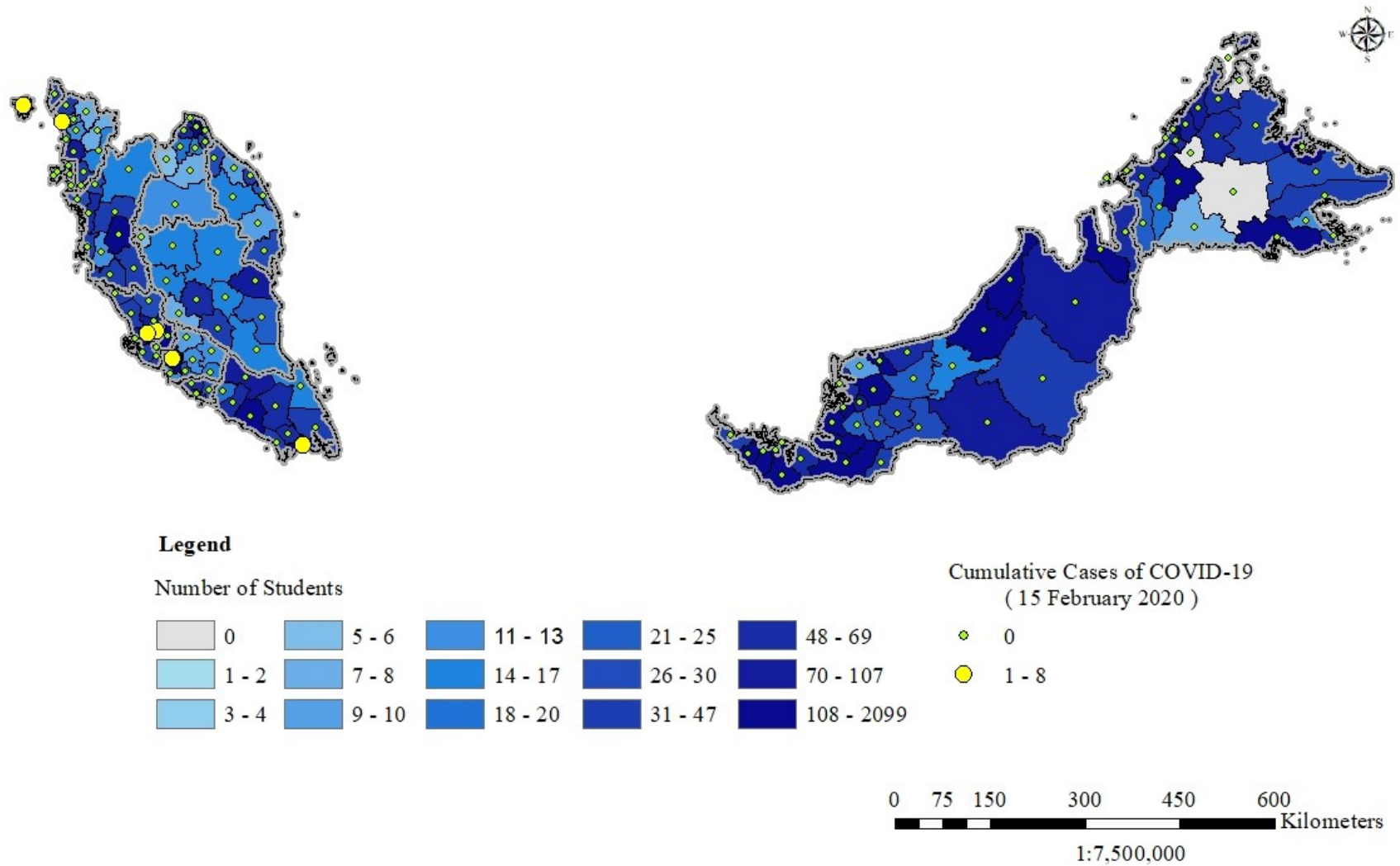
Zone: Sarawak

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Sarawak	Asajaya	3	7	10	0	0	0	0	0	0
Sarawak	Bau	3	6	9	0	0	0	0	0	0
Sarawak	Belaga	0	0	0	0	0	0	0	0	0
Sarawak	Betong	1	3	4	0	0	7	9	14	16
Sarawak	Bintulu	14	15	29	0	0	4	6	8	8
Sarawak	Dalat	0	5	5	0	0	0	0	0	0
Sarawak	Daro	1	1	2	0	0	0	0	0	0
Sarawak	Julau	1	0	1	0	0	0	0	0	0
Sarawak	Kanowit	0	2	2	0	0	0	0	0	0
Sarawak	Kapit	0	1	1	0	0	0	0	0	0
Sarawak	Kuching	89	84	173	0	0	30	97	182	240
Sarawak	Lawas	1	1	2	0	0	1	1	1	1
Sarawak	Limbang	1	3	4	0	0	5	6	7	8
Sarawak	Lubok Antu	0	1	1	0	0	0	0	0	0
Sarawak	Lundu	2	3	5	0	0	0	0	0	0
Sarawak	Marudi	0	1	1	0	0	0	0	0	0
Sarawak	Matu	0	0	0	0	0	0	0	1	1
Sarawak	Meradong	3	2	5	0	0	0	0	0	0
Sarawak	Miri	11	14	25	0	0	8	10	15	15
Sarawak	Mukah	1	1	2	0	0	2	1	1	1
Sarawak	Pakan	0	1	1	0	0	0	0	0	0
Sarawak	Samarahan	20	18	38	0	0	2	11	42	51
Sarawak	Saratok	2	0	2	0	0	0	0	0	0
Sarawak	Sarikei	0	10	10	0	0	4	5	6	6
Sarawak	Selangau	1	4	5	0	0	0	0	0	0
Sarawak	Serian	2	11	13	0	0	2	4	7	7
Sarawak	Sibu	23	10	13	0	0	1	3	4	5
Sarawak	Simunjan	0	1	1	0	0	1	1	1	3
Sarawak	Song	1	0	1	0	0	0	0	0	0
Sarawak	Sri Aman	4	2	6	0	0	0	1	1	1
Sarawak	Tatau	0	0	0	0	0	0	0	0	0
Total	31	184	207	371	0	0	67	155	290	363

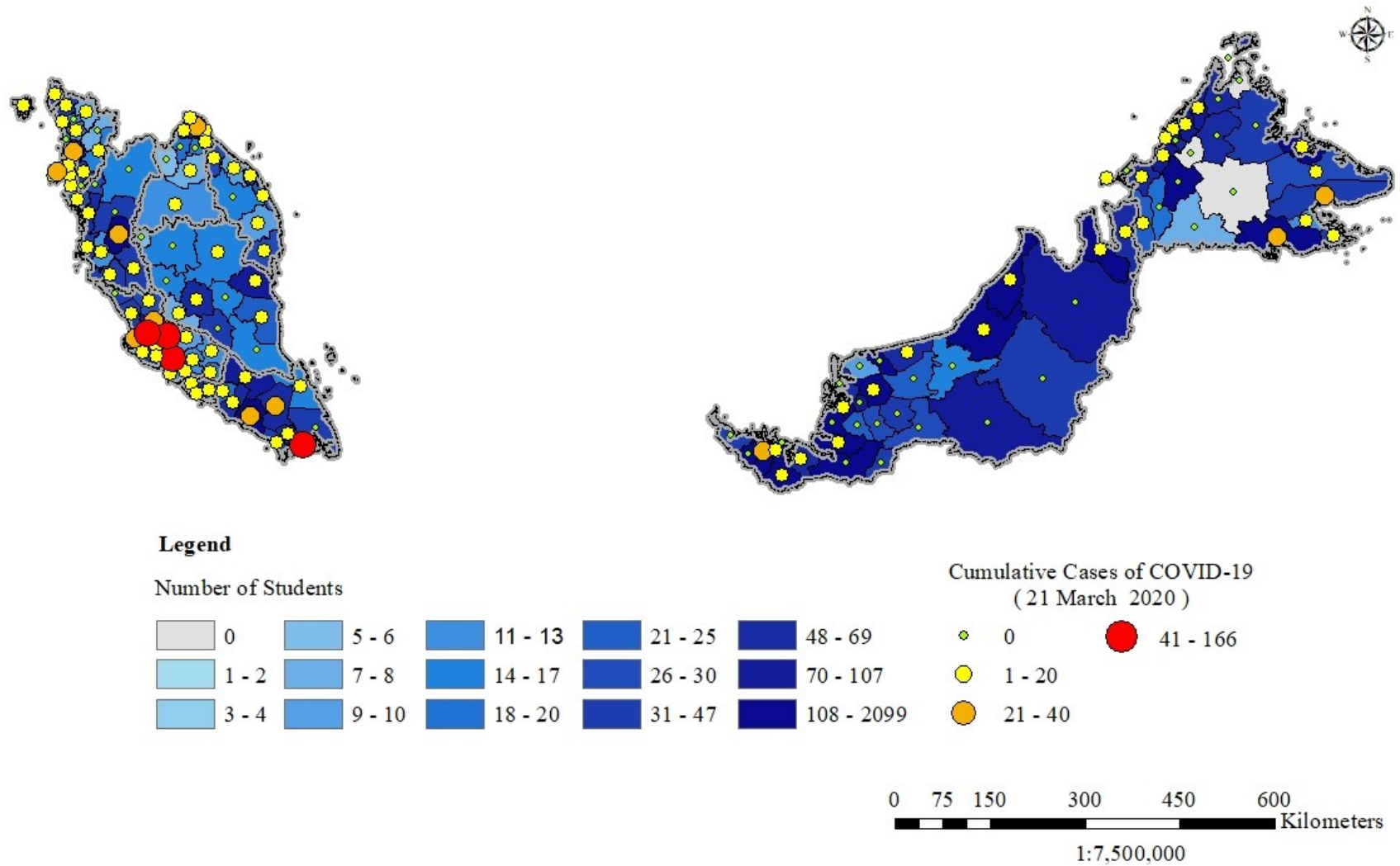
Map 19: Spatial Distribution of UNIMAS 2019/2020 Undergraduate Students and National Coronavirus (COVID-19) Cases on the 25th of January 2020



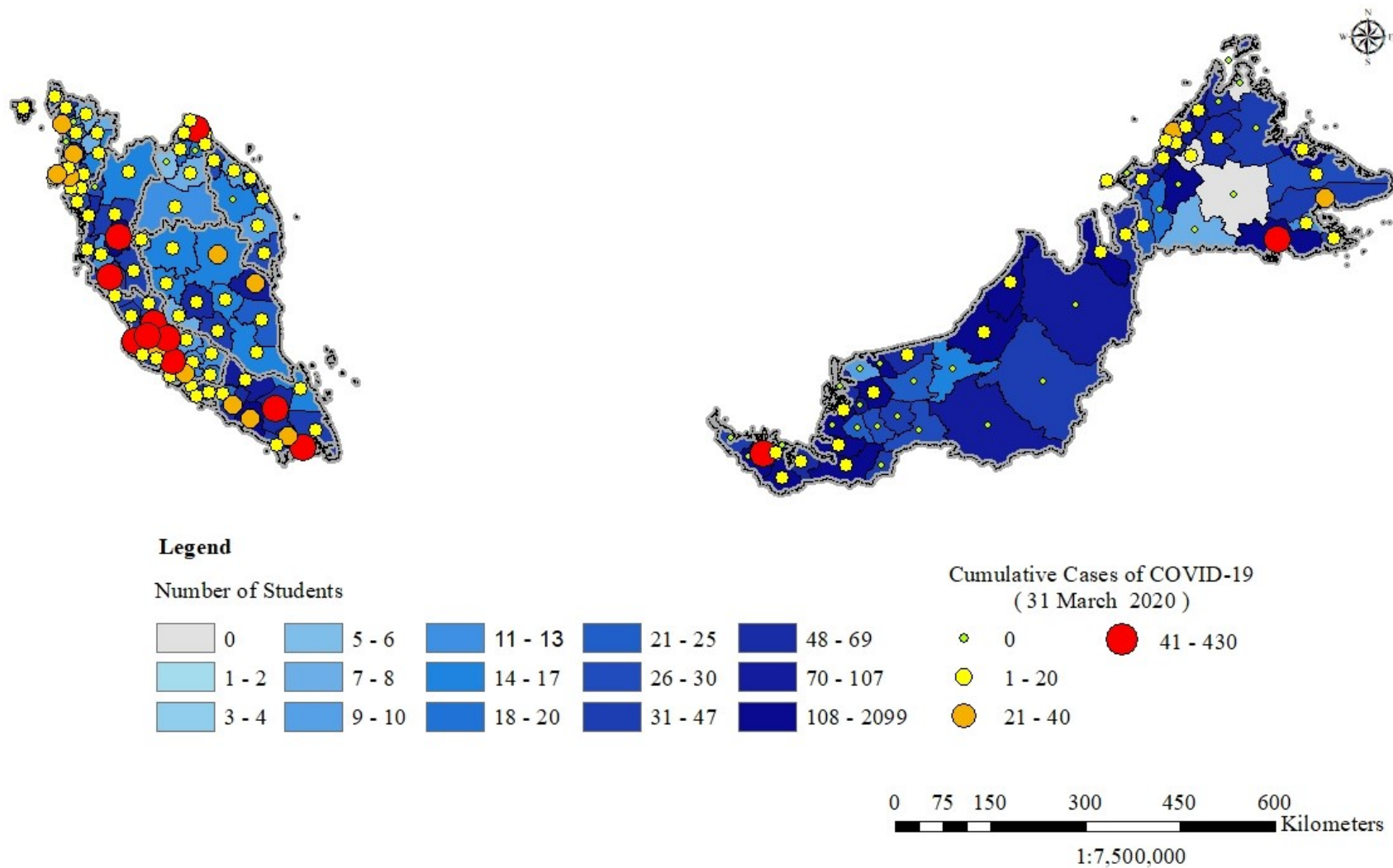
Map 20: Spatial Distribution of UNIMAS 2019/2020 Undergraduate Students and National Coronavirus (COVID-19) Cases on the 15th of February 2020



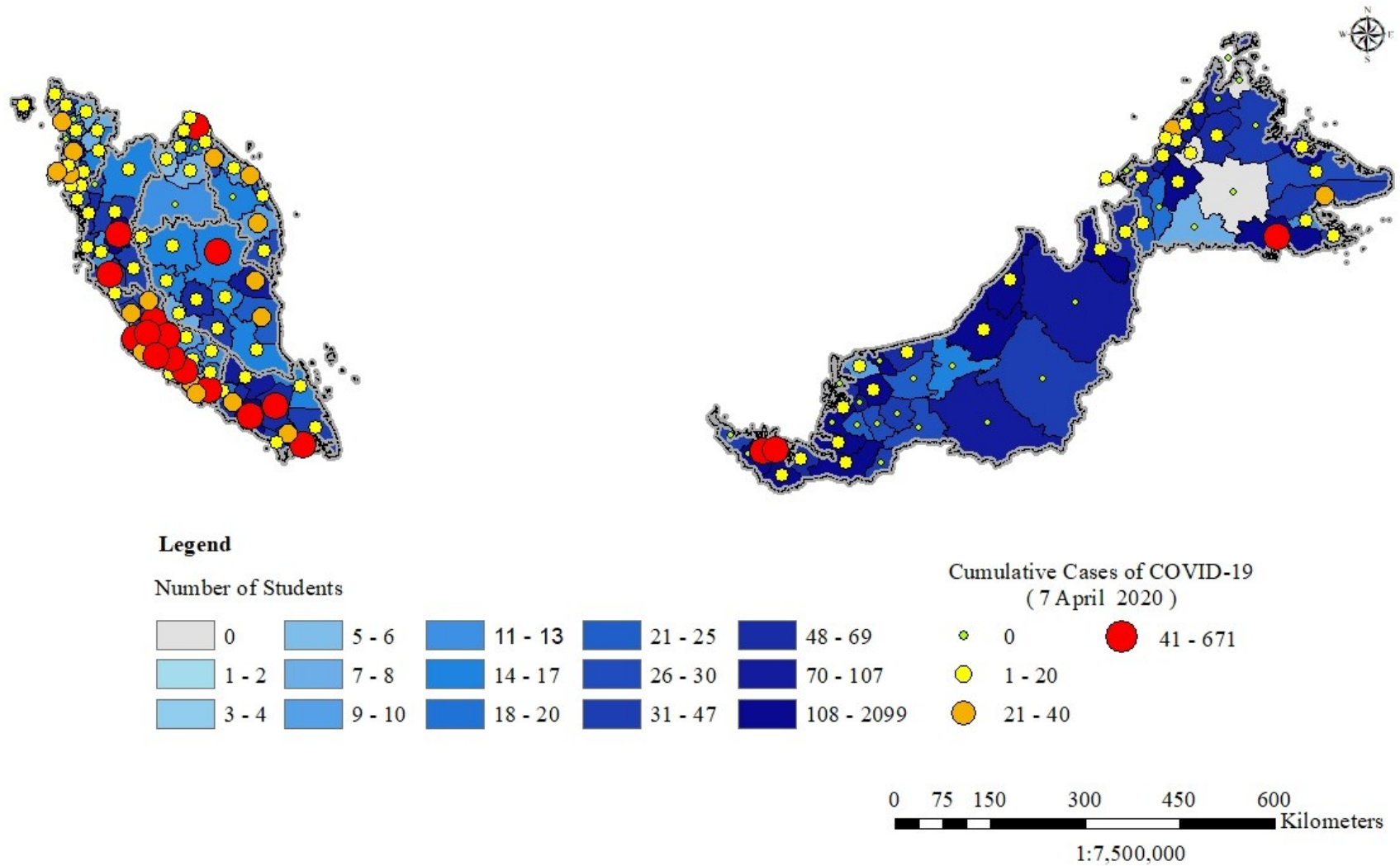
Map 21: Spatial Distribution of UNIMAS 2019/2020 Undergraduate Students and National Coronavirus (COVID-19) Cases on the 21st of March 2020



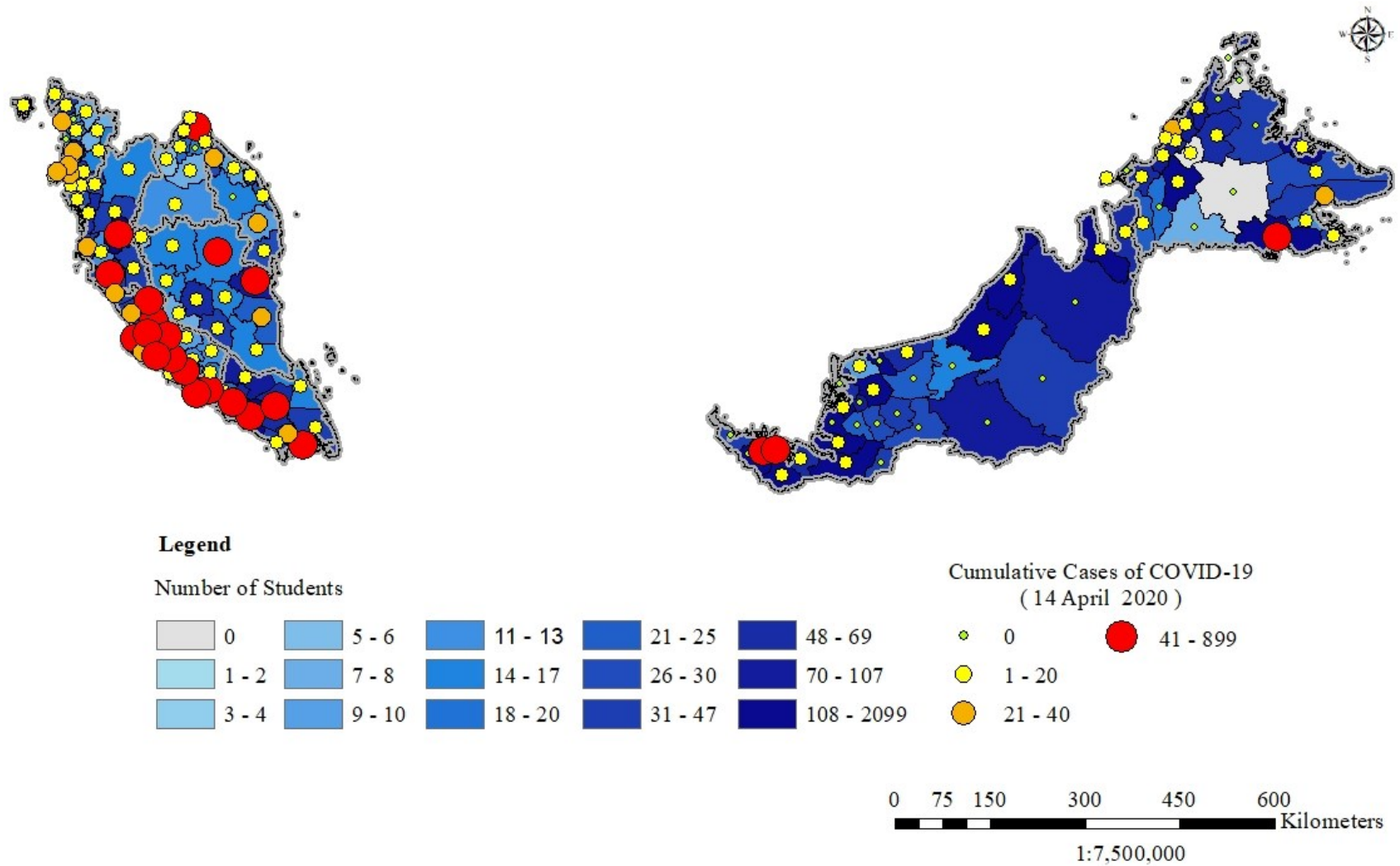
Map 22: Spatial Distribution of UNIMAS 2019/2020 Undergraduate Students and National Coronavirus (COVID-19) Cases on the 31st of March 2020



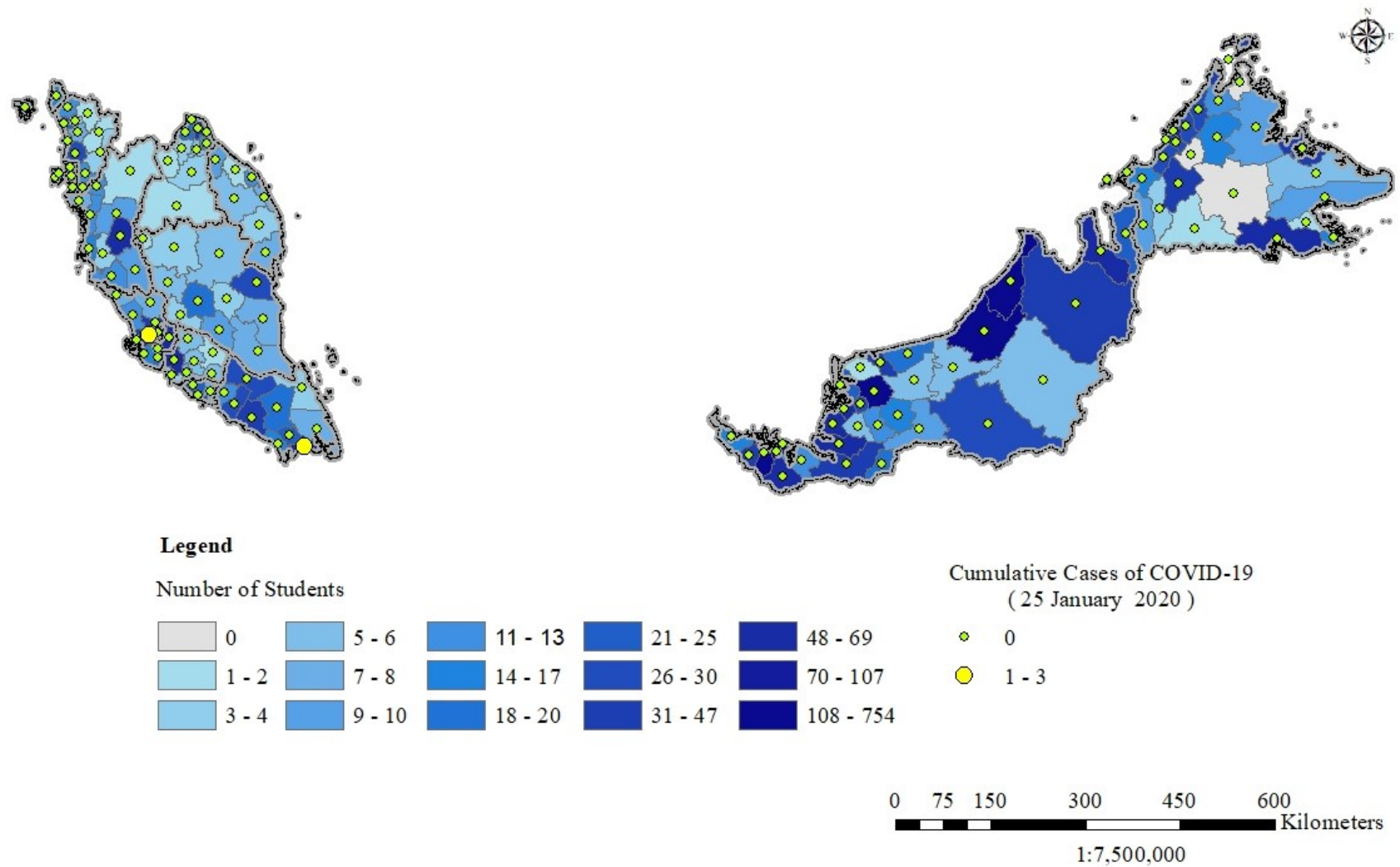
Map 23: Spatial Distribution of UNIMAS 2019/2020 Undergraduate Students and National Coronavirus (COVID-19) Cases on the 7th of April 2020



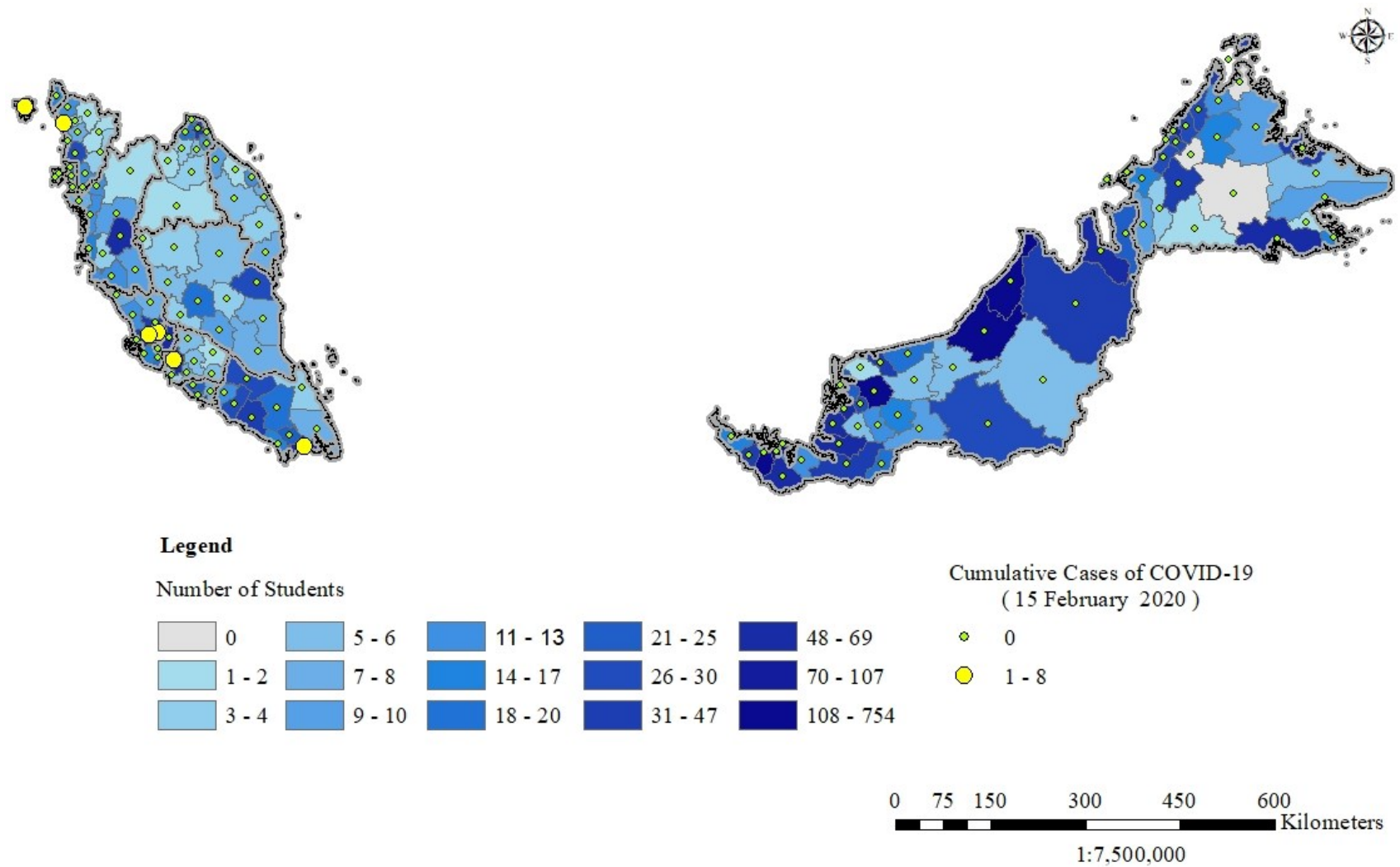
Map 24: Spatial Distribution of UNIMAS 2019/2020 Undergraduate Students and National Coronavirus (COVID-19) Cases on the 14th of April 2020



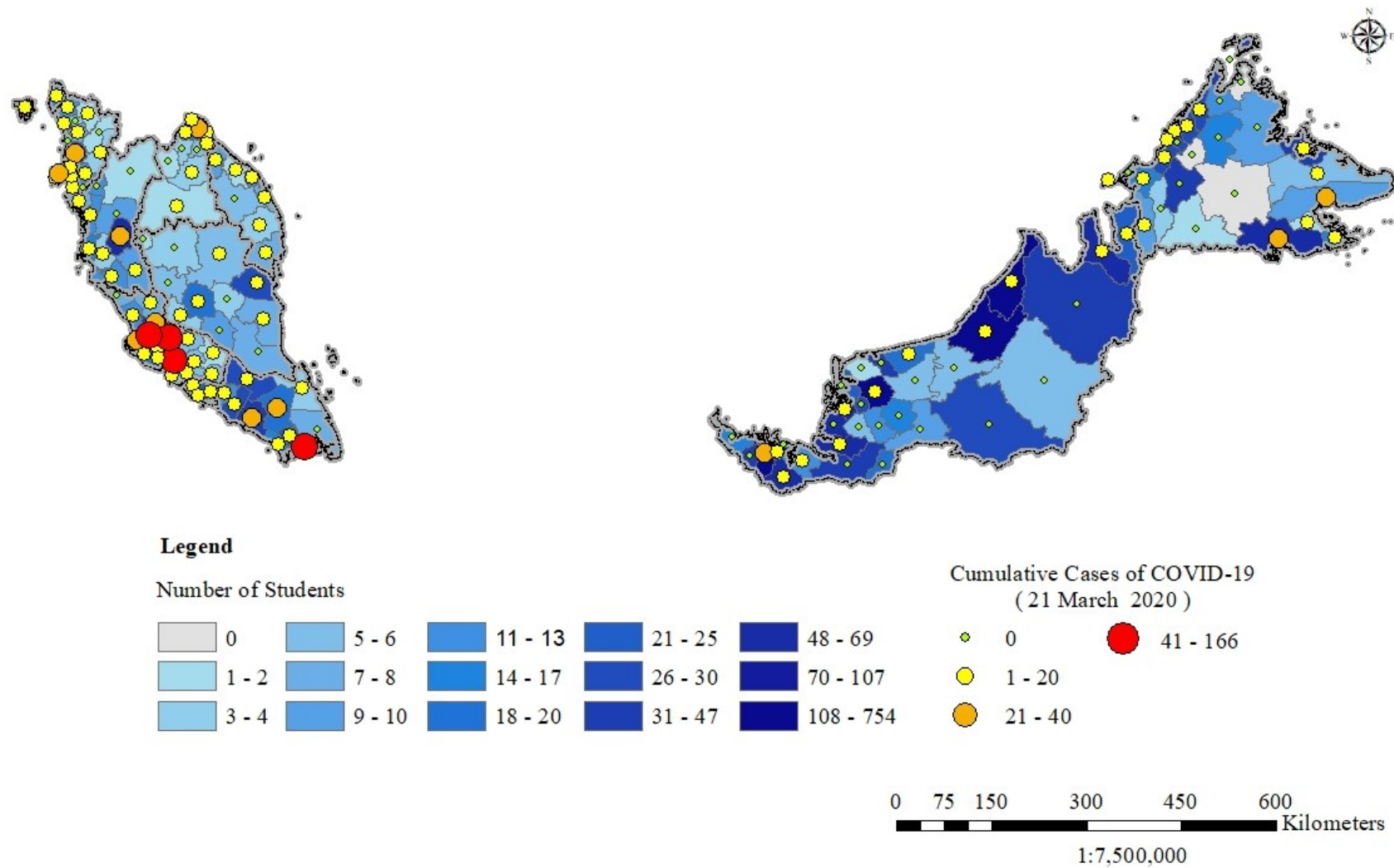
Map 25: Spatial Distribution of UNIMAS 2019/2020 Male Undergraduate Students and National Coronavirus (COVID-19) Cases on the 21st of January 2020



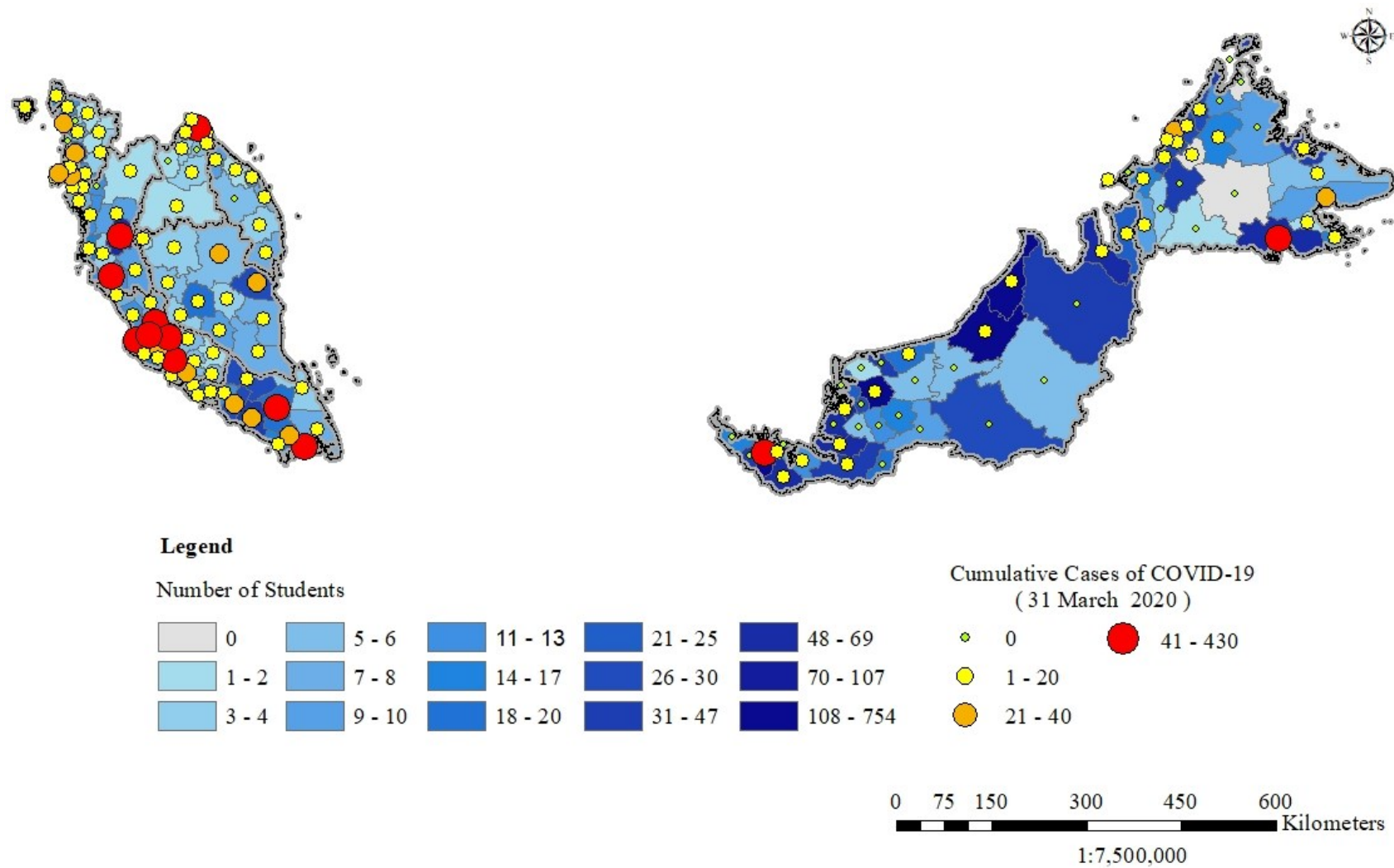
Map 26: Spatial Distribution of UNIMAS 2019/2020 Male Undergraduate Students and National Coronavirus (COVID-19) Cases on the 15th of February 2020



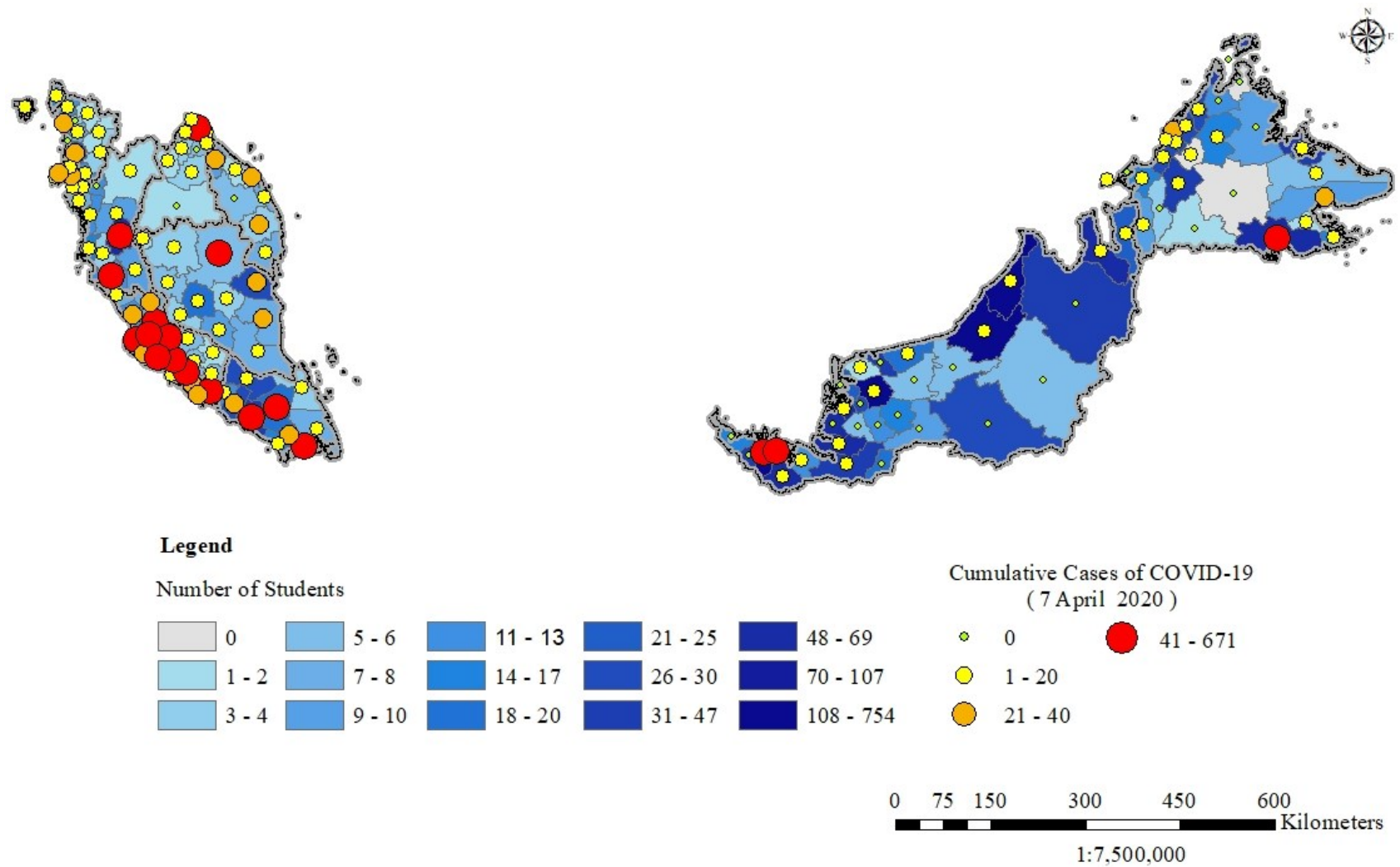
Map 27: Spatial Distribution of UNIMAS 2019/2020 Male Undergraduate Students and National Coronavirus (COVID-19) Cases on the 21st of March 2020



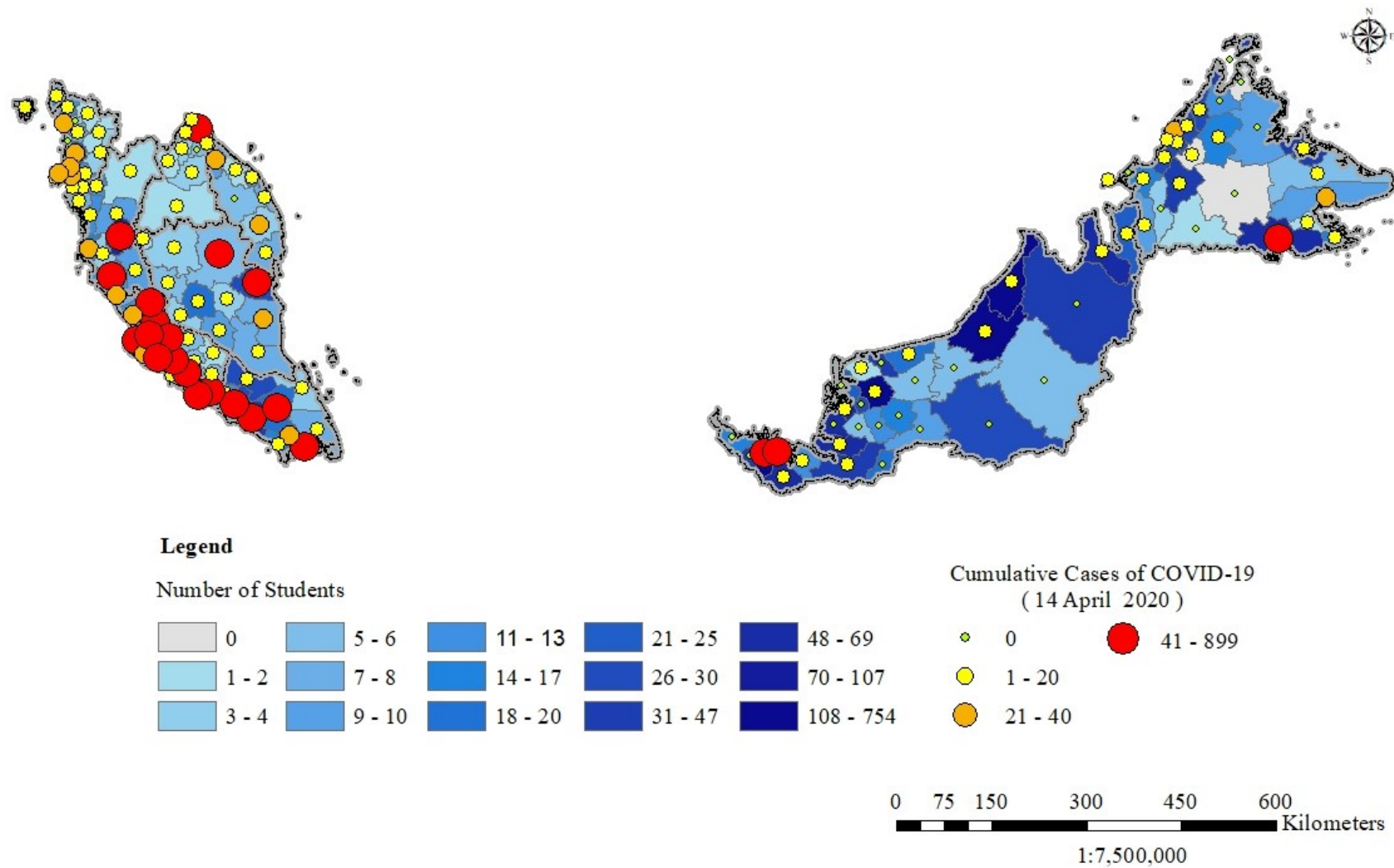
Map 28: Spatial Distribution of UNIMAS 2019/2020 Male Undergraduate Students and National Coronavirus (COVID-19) Cases on the 31st of March 2020



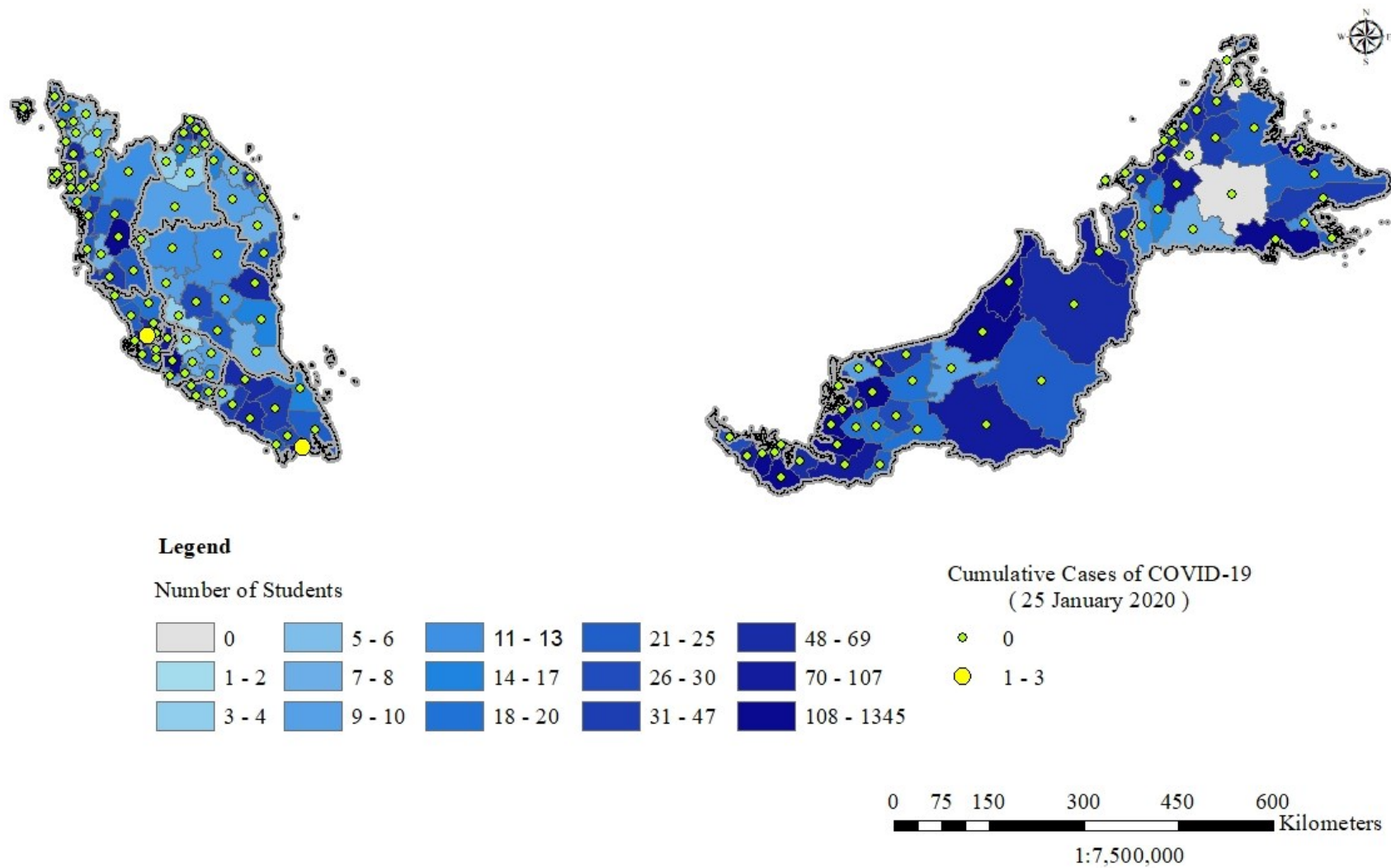
Map 29: Spatial Distribution of UNIMAS 2019/2020 Male Undergraduate Students and National Coronavirus (COVID-19) Cases on the 7th of April 2020



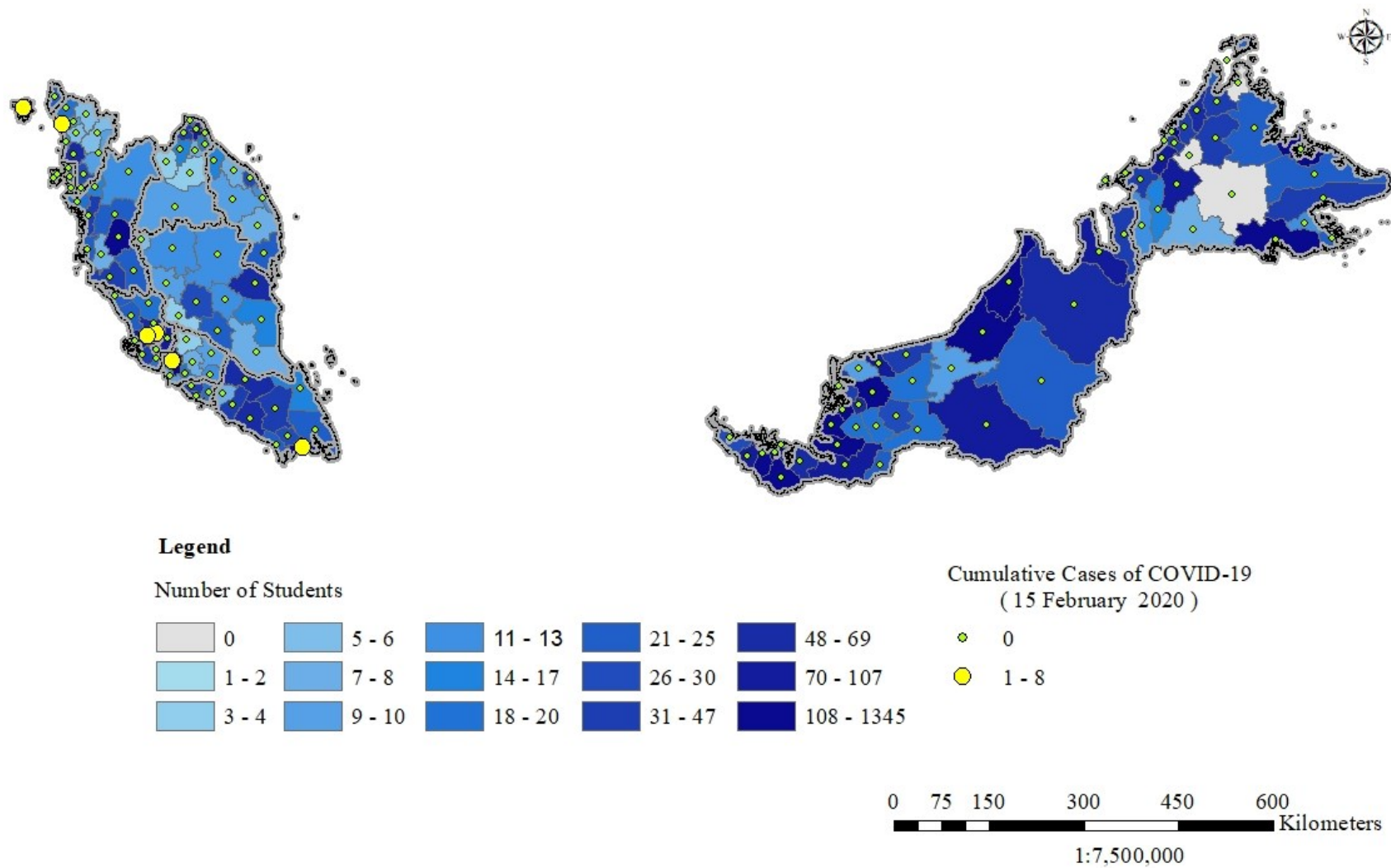
Map 30: Spatial Distribution of UNIMAS 2019/2020 Male Undergraduate Students and National Coronavirus (COVID-19) Cases on the 14th of April 2020



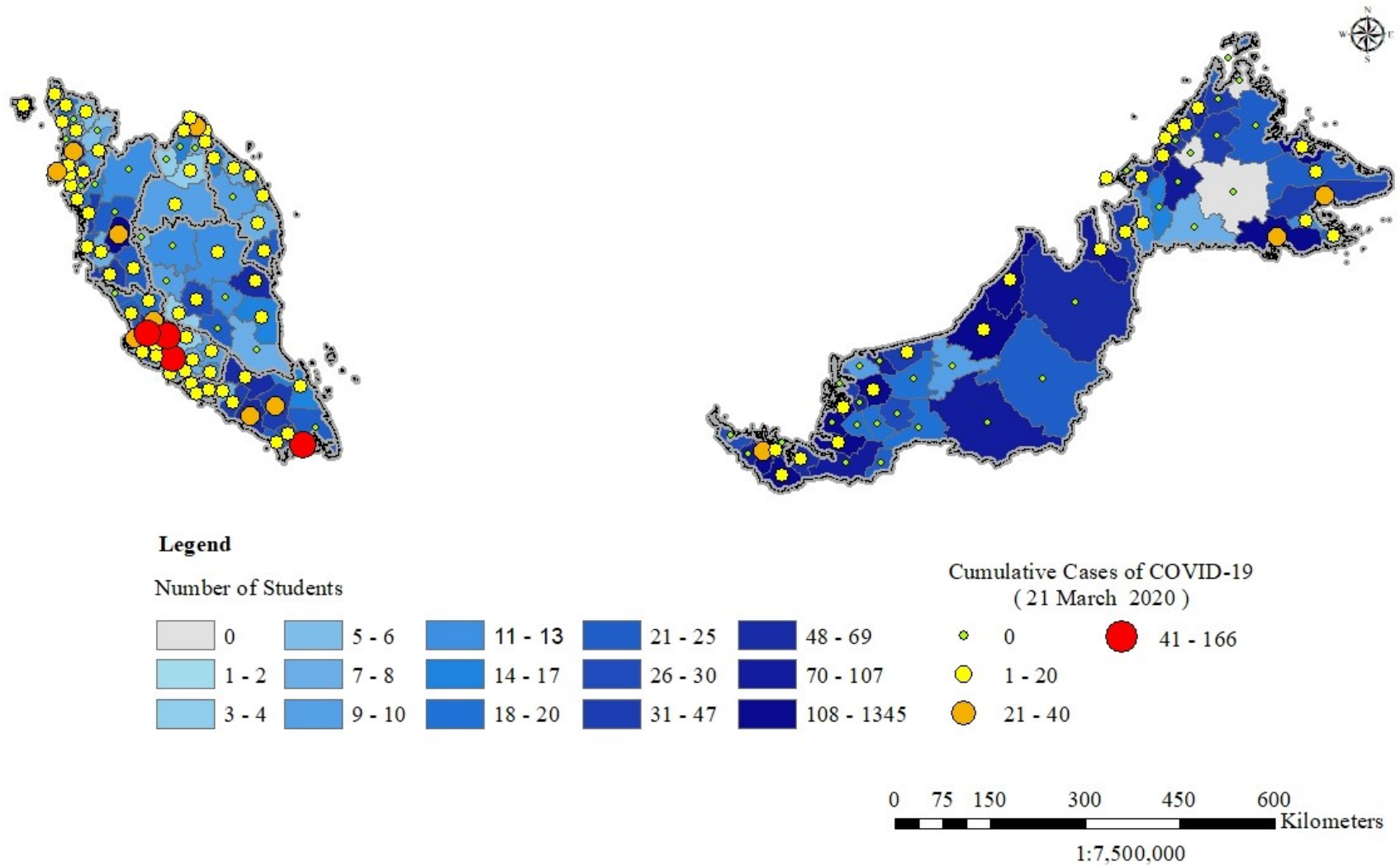
Map 31: Spatial Distribution of UNIMAS 2019/2020 Female Undergraduate Students and National Coronavirus (COVID-19) Cases on the 25th of January 2020



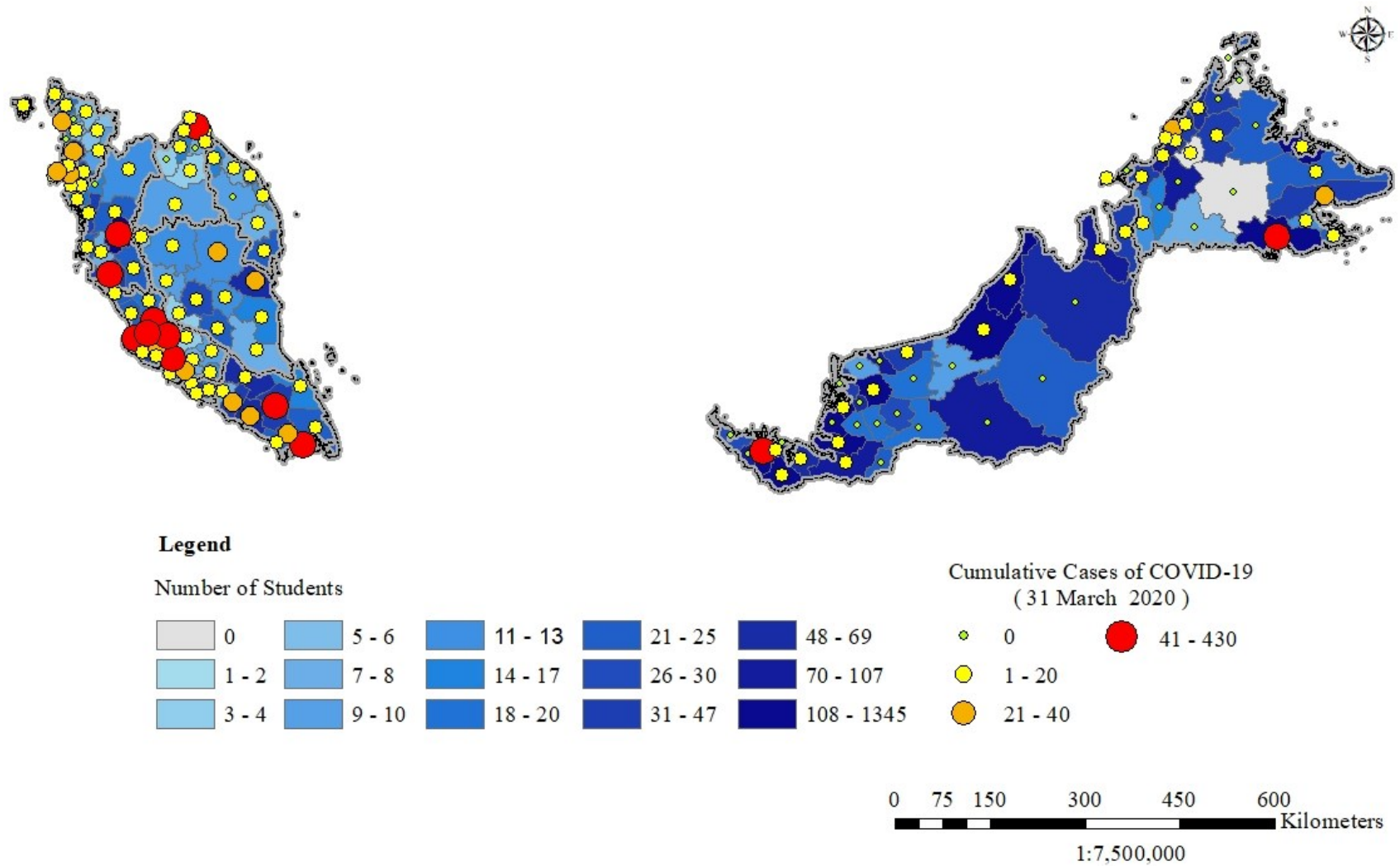
Map 32: Spatial Distribution of UNIMAS 2019/2020 Female Undergraduate Students and National Coronavirus (COVID-19) Cases on the 15th of February 2020



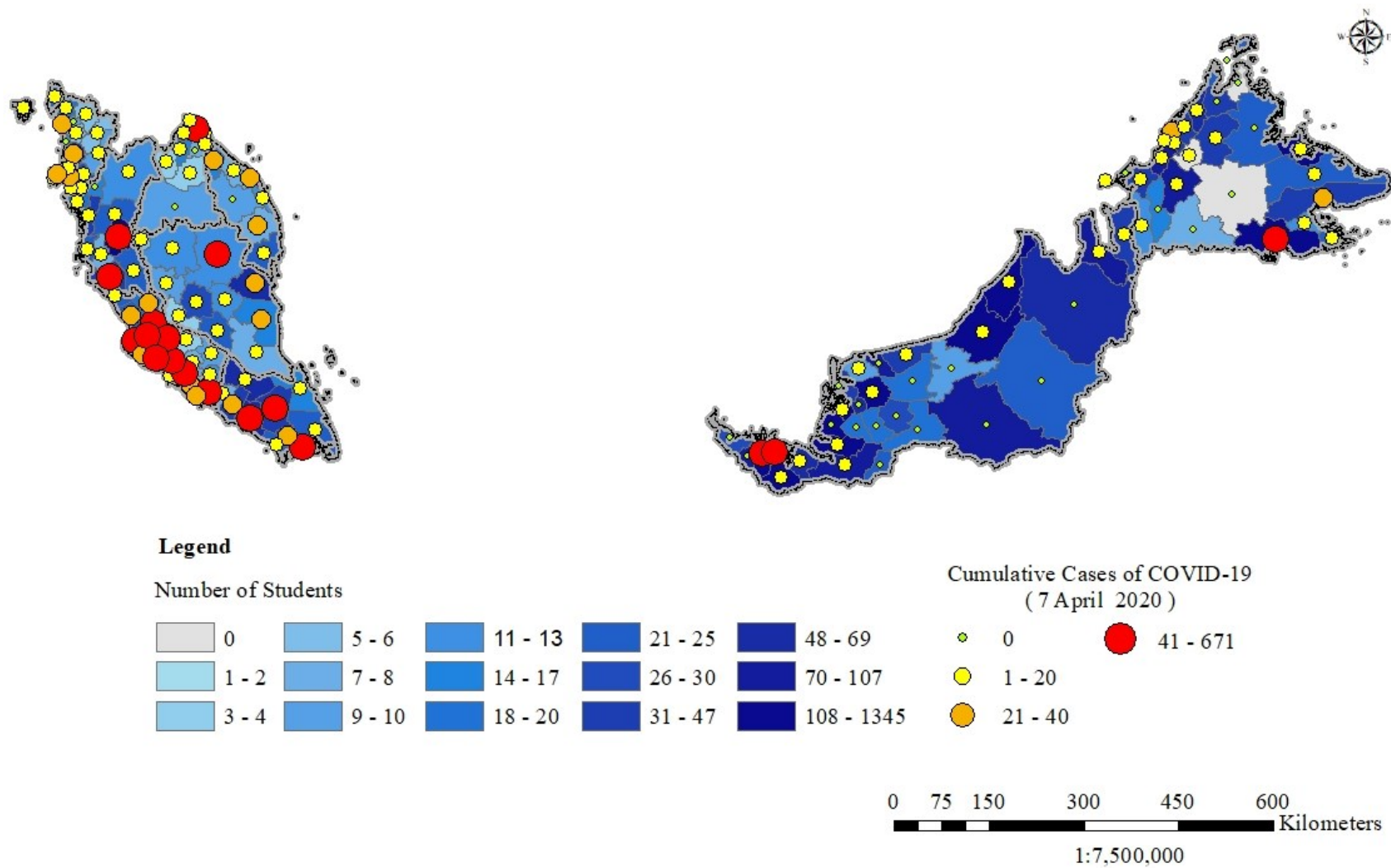
Map 33: Spatial Distribution of UNIMAS 2019/2020 Female Undergraduate Students and National Coronavirus (COVID-19) Cases on the 21st of March 2020



Map 34: Spatial Distribution of UNIMAS 2019/2020 Female Undergraduate Students and National Coronavirus (COVID-19) Cases on the 31st of March 2020



Map 35: Spatial Distribution of UNIMAS 2019/2020 Female Undergraduate Students and National Coronavirus (COVID-19) Cases on the 7th of April 2020



Map 36: Spatial Distribution of UNIMAS 2019/2020 Female Undergraduate Students and National Coronavirus (COVID-19) Cases on the 14th of April 2020

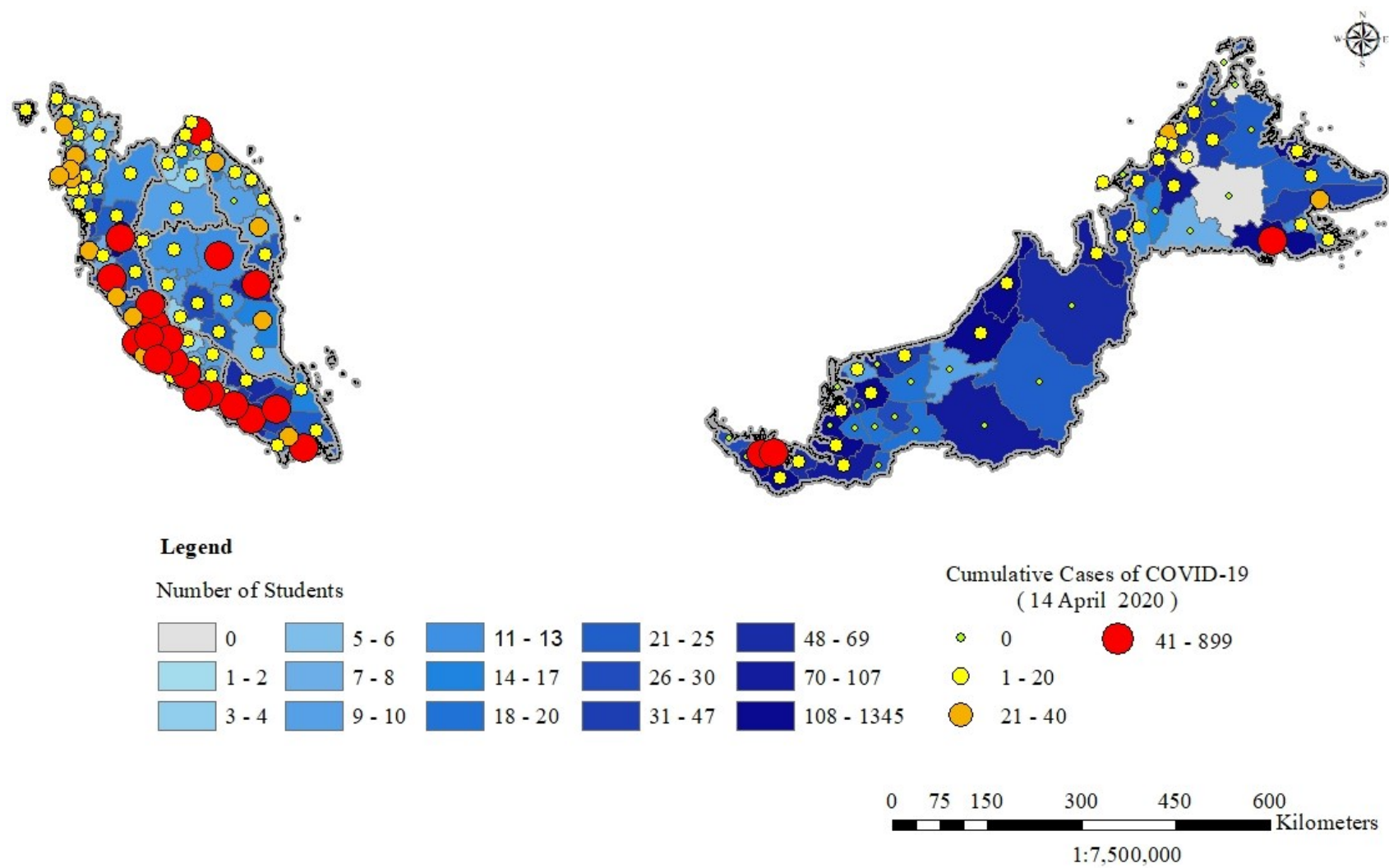


Table 2: Total of UNIMAS 2019/2020 Undergraduate Students and National Coronavirus (COVID-19) Cases by District and Gender

Zone: North (Perlis, Kedah, Pulau Pinang and Perak)

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Perlis	Perlis	13	22	35	0	0	9	12	17	18
Kedah	Baling	4	10	14	0	0	1	1	1	1
Kedah	Bandar Baharu	0	5	5	0	0	1	1	1	1
Kedah	Kota Setar	22	44	66	0	2	10	22	26	26
Kedah	Kuala Muda	27	52	79	0	0	23	30	35	35
Kedah	Kubang Pasu	11	20	31	0	0	1	7	8	8
Kedah	Kulim	12	28	40	0	0	1	7	10	13
Kedah	Padang Terap	2	5	7	0	0	1	1	1	1
Kedah	Pendang	7	6	13	0	0	2	3	3	3
Kedah	Pokok Sena	3	10	13	0	0	0	0	0	0
Kedah	Sik	1	6	7	0	0	1	1	1	1
kedah	Yan	4	11	15	0	0	0	0	0	0
kedah	Langkawi	3	6	9	0	2	4	4	4	4
Pulau Pinang	Daerah Barat Daya	16	30	46	0	0	0	9	11	13
Pulau Pinang	Daerah Timur Laut	23	48	71	0	0	19	27	27	32
Pulau Pinang	Seberang Perai Utara	17	30	47	0	0	0	15	17	23
Pulau Pinang	Seberang Perai Tengah	20	28	48	0	0	16	32	37	40
Pulau Pinang	Seberang Perai Selatan	16	31	47	0	0	0	11	11	11
Perak	Hulu Perak	1	13	14	0	0	0	5	6	6
Perak	Kerian	6	21	27	0	0	7	13	16	19
Perak	Larut dan Matang	11	38	49	0	0	3	11	17	19
Total	21	219	464	683	0	4	99	212	249	274

Zone: Central Group 1 (Perak, Selangor, Kuala Lumpur and Putrajaya)

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Perak	Kuala Kangsar	10	23	33	0	0	0	2	2	4
Perak	Manjung	14	25	39	0	0	4	12	16	22
Perak	Kinta	69	121	190	0	0	21	77	93	93
Perak	Kampar	11	17	28	0	0	0	0	0	2
Perak	Perak Tengah	4	7	11	0	0	6	7	9	11
Perak	Hilir Perak	12	34	46	0	0	13	57	65	66
Perak	Batang Padang	9	23	32	0	0	1	5	8	9
Selangor	Gombak	39	68	107	0	0	38	62	111	141
Selangor	Hulu Langat	52	107	159	0	0	75	265	345	433
Selangor	Hulu selangor	7	20	27	0	0	3	12	27	49
Selangor	Klang	32	74	106	0	0	23	74	123	167
Selangor	Kuala Langat	14	33	47	0	0	8	16	22	25
Selangor	Kuala Selangor	11	22	33	0	0	17	19	30	35
Selangor	Petaling	68	171	239	3	8	96	234	306	359
Selangor	Sabak Bernam	8	23	31	0	0	0	2	10	23
Selangor	Sepang	18	18	36	0	0	8	17	46	67
Federal Territory	Kuala Lumpur	54	128	182	0	4	166	430	671	899
Federal Territory	Putrajaya	4	11	15	0	0	9	26	43	54
Total	18	436	925	1361	3	12	488	1317	1927	2459

Zone: Central Group 2 (Pahang, Negeri Sembilan and Melaka)

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Pahang	Bentong	4	3	7	0	0	4	6	11	15
Pahang	Bera	9	25	34	0	0	0	9	9	9
Pahang	Cameron Highlands	1	5	6	0	0	0	1	1	2
Pahang	Jerantut	5	12	17	0	0	7	27	61	70
Pahang	Kuantan	27	68	95	0	0	11	24	40	91
Pahang	Lipis	2	12	14	0	0	0	3	7	9
Pahang	Maran	4	11	15	0	0	0	5	6	6
Pahang	Pekan	6	17	23	0	0	13	20	23	23
Pahang	Raub	5	9	14	0	0	0	1	1	1
Pahang	Rompin	8	8	16	0	0	0	2	3	3
Pahang	Temerloh	20	29	49	0	0	2	4	5	7
Negeri Sembilan	Jelevu	6	4	10	0	0	1	1	1	2
Negeri Sembilan	Jempol	2	9	11	0	0	1	4	9	12
Negeri Sembilan	Kuala Pilah	11	2	13	0	0	1	3	4	35
Negeri Sembilan	Port Dickson	4	9	13	0	0	3	6	9	9
Negeri Sembilan	Rembau	7	18	25	0	0	10	33	47	53
Negeri Sembilan	Seremban	51	125	176	0	2	44	119	174	261
Negeri Sembilan	Tampin	5	11	16	0	0	10	16	17	19
Melaka	Alor Gajah	22	31	53	0	0	6	14	25	28
Melaka	Jasin	7	19	26	0	0	11	19	42	68
Melaka	Melaka Tengah	35	64	99	0	0	5	19	36	51
Total	21	241	491	732	0	2	129	336	531	774

Zone: East Coast (Kelantan and Terengganu)

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Kelantan	Bachok	11	23	34	0	0	7	10	11	11
Kelantan	Gua Musang	2	10	12	0	0	1	2	2	2
Kelantan	Jeli	2	3	5	0	0	0	0	2	2
Kelantan	Kota Bharu	43	82	125	0	0	29	80	85	90
Kelantan	Kuala Krai	3	4	7	0	0	8	10	11	11
Kelantan	Machang	6	8	14	0	0	0	0	0	0
Kelantan	Pasir Mas	18	35	53	0	0	9	10	10	11
Kelantan	Pasir Puteh	11	16	27	0	0	4	8	8	8
Kelantan	Tanah Merah	4	16	20	0	0	0	3	6	6
Kelantan	Tumpat	17	20	37	0	0	3	8	12	13
Terengganu	Besut	8	18	26	0	0	7	16	29	32
Teengganu	Dungun	3	7	10	0	0	5	8	27	37
Terengganu	Hulu Terengganu	5	9	14	0	0	0	0	0	0
Terengganu	Kemaman	8	21	29	0	0	1	3	4	5
Terengganu	Kuala Terengganu	12	29	41	0	0	12	18	21	22
Terengganu	Marang	8	13	21	0	0	1	1	2	2
Terengganu	Setiu	2	8	10	0	0	1	1	7	8
Total	17	163	322	485	0	0	88	178	237	260

Zone: Southern (Johor)

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Johor	Batu Pahat	33	67	100	0	0	23	39	48	51
Johor	Johor Bahru	65	146	211	0	4	52	112	146	184
Johor	Kluang	19	42	61	0	0	26	107	174	201
Joho	Kota Tinggi	8	23	31	0	0	0	12	14	19
Johor	Kulai	22	30	52	0	0	5	23	24	38
Johor	Ledang	11	7	18	0	0	3	5	7	14
Johor	Mersing	3	11	17	0	0	1	3	4	4
Johor	Muar	27	38	65	0	0	13	27	35	44
Johor	Pontian	15	23	38	0	0	3	12	14	17
Johor	Segamat	27	57	84	0	0	1	9	12	15
Total	10	230	444	677	0	4	127	349	478	587

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Federal Territory	Labuan	16	26	42	0	0	5	12	13	15
Sabah	Beaufort	17	37	54	0	0	6	7	9	10
Sabah	Beluran	10	22	32	0	0	0	0	0	0
Sabah	Keningau	30	90	120	0	0	0	0	1	11
Sabah	Kinabatangan	5	22	27	0	0	11	14	17	19
Sabah	Kota Belud	28	51	79	0	0	5	5	5	5
Sabah	Kota Kinabalu	61	115	176	0	0	17	29	34	40
Sabah	Kota Marudu	12	39	51	0	0	0	0	0	0
Sabah	Kuala Penyu	0	0	0	0	0	0	0	0	0
Sabah	Kudat	21	35	56	0	0	0	0	0	0
Sabah	Kunak	2	11	13	0	0	5	7	8	8
Sabah	Lahad Datu	9	37	46	0	0	32	35	38	39
Sabah	Nabawan	1	7	8	0	0	0	0	0	0
Sabah	Papar	29	71	100	0	0	1	2	3	4
Sabah	Penampang	27	36	63	0	0	0	1	6	11
Sabah	Pitas	0	0	0	0	0	0	0	0	0
Sabah	Putatan	13	18	31	0	0	3	7	8	8
Sabah	Ranau	15	42	57	0	0	0	2	2	2
Sabah	Sandakan	33	112	145	0	0	8	16	19	20
Sabah	Semporna	14	21	35	0	0	1	1	2	2
Sabah	Sipitang	10	11	21	0	0	4	4	4	4
Sabah	Tambunan	0	0	0	0	0	0	1	1	3
Sabah	Tawau	62	112	174	0	0	37	63	67	79
Sabah	Tenom	3	17	20	0	0	0	0	0	0
Sabah	Tongod	0	0	0	0	0	0	0	0	0
Sabah	Tuaran	30	46	76	0	0	6	12	17	20
Total	26	488	978	1426	0	0	141	218	254	300

Zone: Sarawak

State	District	Gender		Number of Students	National Coronavirus (COVID-19) Cumulative Cases					
		Male	Female		First Wave		MCO First Phase		MCO Second Phase	
					25 January	15 February	21 March	31 March	7 April	14 April
Sarawak	Asajaya	27	174	201	0	0	0	0	0	0
Sarawak	Bau	38	71	109	0	0	0	0	0	0
Sarawak	Belaga	6	25	31	0	0	0	0	0	0
Sarawak	Betong	53	118	171	0	0	7	9	14	16
Sarawak	Bintulu	126	282	408	0	0	4	6	8	8
Sarawak	Dalat	43	92	135	0	0	0	0	0	0
Sarawak	Daro	22	75	53	0	0	0	0	0	0
Sarawak	Julau	11	19	30	0	0	0	0	0	0
Sarawak	Kanowit	16	28	44	0	0	0	0	0	0
Sarawak	Kapit	29	70	99	0	0	0	0	0	0
Sarawak	Kuching	755	1344	2099	0	0	30	97	182	240
Sarawak	Lawas	24	42	66	0	0	1	1	1	1
Sarawak	Limbang	57	70	127	0	0	5	6	7	8
Sarawak	Lubok Antu	19	21	40	0	0	0	0	0	0
Sarawak	Lundu	16	26	42	0	0	0	0	0	0
Sarawak	Marudi	31	53	84	0	0	0	0	0	0
Sarawak	Matu	1	9	10	0	0	0	0	1	1
Sarawak	Meradong	27	67	94	0	0	0	0	0	0
Sarawak	Miri	183	358	541	0	0	8	10	15	15
Sarawak	Mukah	18	46	64	0	0	1	1	1	1
Sarawak	Pakan	5	19	24	0	0	0	0	0	0
Sarawak	Samarahan	249	345	594	0	0	2	11	42	51
Sarawak	Saratok	66	153	219	0	0	0	0	0	0
Sarawak	Sarikei	66	130	196	0	0	4	5	6	6
Sarawak	Selangau	6	18	24	0	0	0	0	0	0
Sarawak	Serian	61	165	226	0	0	2	4	7	7
Sarawak	Sibu	260	400	660	0	0	1	3	4	5
Sarawak	Simunjan	13	51	64	0	0	1	1	1	3
Sarawak	Song	9	20	29	0	0	0	0	0	0
Sarawak	Sri Aman	46	104	150	0	0	0	1	1	1
Sarawak	Tatau	5	10	15	0	0	0	0	0	0
Total	31	2288	4405	6649	0	0	66	155	290	363