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Invited View Point

The COVID-19 outbreak in Sri Lanka: A synoptic analysis focusing on trends, impacts, risks and science-policy interaction processes

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1. Introduction

The Global Response to Infectious Diseases [GRID] index was introduced based on a research study commissioned by the Institute of Certified Management Accountants, Australia. The index was created to rank countries across the globe taking into account the effectiveness and efficiency of leadership and preparedness of health systems in each country in managing the COVID-19 pandemic [9]. In April 2020 Sri Lanka ranked 10th in the GRID index thus, achieving global recognition for its response to the pandemic [9]. This paper provides an analysis of Sri Lanka's response to the 1st wave of COVID-19, particularly focusing on three aspects: 1) trends and impacts; 2) risk governance and 3) science policy interaction. In exploring the trends and impacts of the COVID-19 outbreak in the country, the present paper discusses the health and socio-economic impacts and how these impacts were reported. With regard to the aspect of risk governance, attention has been paid to the manner in which risk knowledge, risk assessment, communication and advocacy and monitoring with early warning were utilised in managing the pandemic situation in the country. Further, the aspect of science policy interaction has been examined with reference to the way science and expertise were mobilized for decision-making and the data and evidences-related challenges faced in countering the virus outbreak in the country. The main objective of the present paper is to provide insights to national policy-makers on the way COVID-19 affected Sri Lanka, and how the crisis was managed and governed.

2. Methodology

Information presented and reviewed in this paper has been obtained from various up-to-date secondary sources including scholarly articles, government publications [both online and print], local and international news websites, publications and websites of relevant Non-Governmental Organizations [NGOs]; International Non-Governmental Organizations [INGOs] and International Organizations and webinars. Apart from this, the paper has drawn from qualitative in-depth key informant interviews conducted with sub-national level state authorities in order to probe into how the virus outbreak was managed at the local level and grass-root level issues and challenges. The interviews were carried out with the District Secretary of the Polonnaruwa District; the Divisional Secretary of the Thamakaduwa Divisional Secretariat Division [DSD] of the Polonnaruwa district and Assistant Directors of the District Disaster Management Coordinating Units in the Ratnapura and Badulla districts of Sri Lanka. The districts from which the interviewees were sourced were purposively selected based on the following reasons. The Polonnaruwa district is the focal point of rice production in the country. Rice being the staple food of Sri Lanka, uninterrupted continuity of agricultural activities had to be ensured in the district regardless of the constraints posed by COVID-19. Simultaneously, said district was also host to the Kandakadu Quarantine Centre: one of the main quarantine centres that were functioning in the island. Further, the districts of Ratnapura and Badulla were at risk from floods and landslides respectively

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during the COVID-19 outbreak which meant that these districts were faced with the risk of compound events or parallel hazards. The mentioned districts therefore qualified as interesting cases capable of providing insights into various dimensions of managing the pandemic situation at the local level. Both primary and secondary data gathered were qualitative in nature and were therefore subject to thematic analysis.

This paper primarily examines in detail the aspects of 1) trends and impacts; 2) risk governance and 3) science policy interaction pertaining to the country's attempts at combatting the 1st wave of the COVID-19 pandemic. The key facts pertaining to said aspects have been summarised in fig. 01. This is followed by a discussion that provides a gist of the key strengths and limitations of Sri Lanka's response to the outbreak [also see Fig. 2]. Finally, the paper provides key considerations for national policing and planning related to pandemic preparedness and response simultaneously identifying future directions for research. (See Fig. 1.)

3. Trends and impact

3.1. Origin, evolution and impacts of COVID-19 in Sri Lanka

Throughout its history, the world has been plagued by a number of pandemic outbreaks like the Spanish flu of 1918 and the Asian flu of 1957 [30]. The most recent and perhaps, one of the most widespread outbreaks, is the COVID-19 pandemic, which has continued to debilitate the entire global system. Tracing the roots of the COVID-19 pandemic, on 31st December 2019, an outbreak of a pneumonia of unknown reason was identified and reported from the Wuhan City in Hubei Province of China to the World Health Organization [WHO] Country Office for China [44]. On 7th January 2020, this was diagnosed as the 'Novel Corona Virus'. While on 30th January, the outbreak of the virus was declared a Public Health Emergency of International Concern [PHIEC] by the WHO, on 11th March 2020 it was recognised as a pandemic [14].

In Sri Lanka, the first confirmed case of COVID-19 was reported on 27th January 2020. The infected person was a Chinese national who had arrived in Sri Lanka as a tourist two weeks prior to the reported date. By 27th January 2020, the Corona Virus had been reported from 11 countries with 2798 confirmed cases and 80 deaths. The Chinese national who was diagnosed with COVID-19 was admitted to the National Institute of Infectious Diseases [NIID] and subject to treatment [14]. By 28th January 2020, five other individuals were suspected of the Corona Virus, out of which two were Sri Lankan nationals. These individuals were kept under surveillance at the NIID [14].

On 19th February 2020, the first confirmed patient was fully recovered and discharged from the NIID. There were no other confirmed cases reported in the country until a tour guide working with Italian tourists was diagnosed with the virus and thus, identified as the second confirmed case [also the first local case] on 11th March 2020 [14]. By 31st March 2020, the total number of confirmed cases in the country had increased to 122 reporting 2 deaths. By 31st July 2020, the number of COVID-19 cases in Sri Lanka had escalated to a total of 2814, including 951 imported cases constituting returnees from other countries, and 1833 local cases. The majority of local cases constituted individuals from the Sri Lanka Navy and their close contacts [14]. The latest statistics indicate that close to 2500 confirmed cases and a total of 12 deaths have been reported in the country.

Illustrating the systemic nature of risk, the COVID-19 pandemic soon transformed from a health crisis to a social and economic crisis causing a number of adverse economic and social effects in the country. For example, Sri Lanka's Gross Domestic Product [GDP], which was expected to rise by 4.5%–5% following the 2019 Easter Sunday attack, was predicted to rise at a rate of only 2.2% when the country was hit by the pandemic [22]. The lockdown also posed a detrimental impact on the country's key economic sectors, namely manufacturing and services. Elaborating on this, the tourism sector, which is one of the key service sectors in the country, contributes to around 5% of the country's GDP [43]. However, owing to the worldwide travel bans imposed during the pandemic period, the arrival of tourists in the country decreased by 71% in March 2020 and tourists arrivals were nil in the following months of April, May and June [41]. Similarly, the Purchasing Manager's Index [PMI] of the manufacturing sector, which was recorded at 54 in January 2020 dropped to 24.2 in April 2020

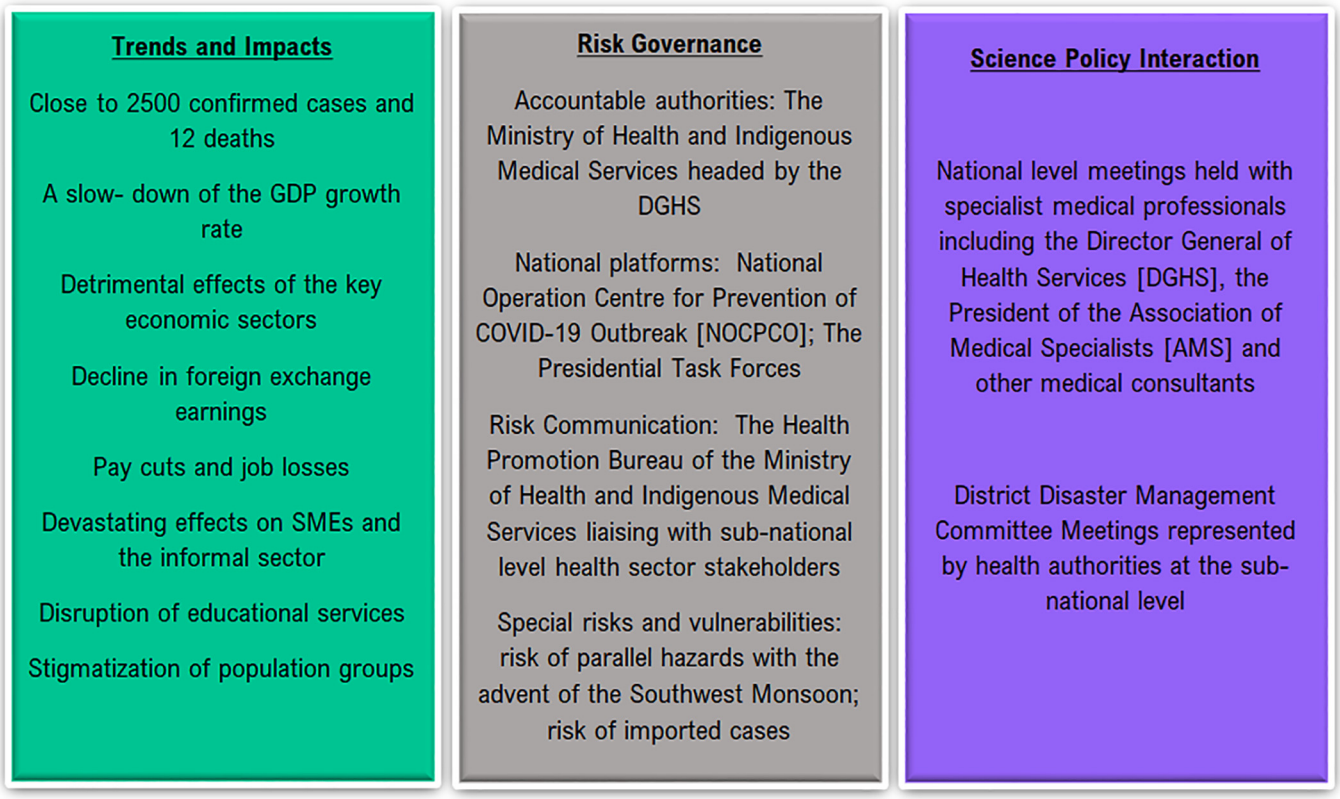

Fig. 1. COVID-19 in Sri Lanka: Key Facts.

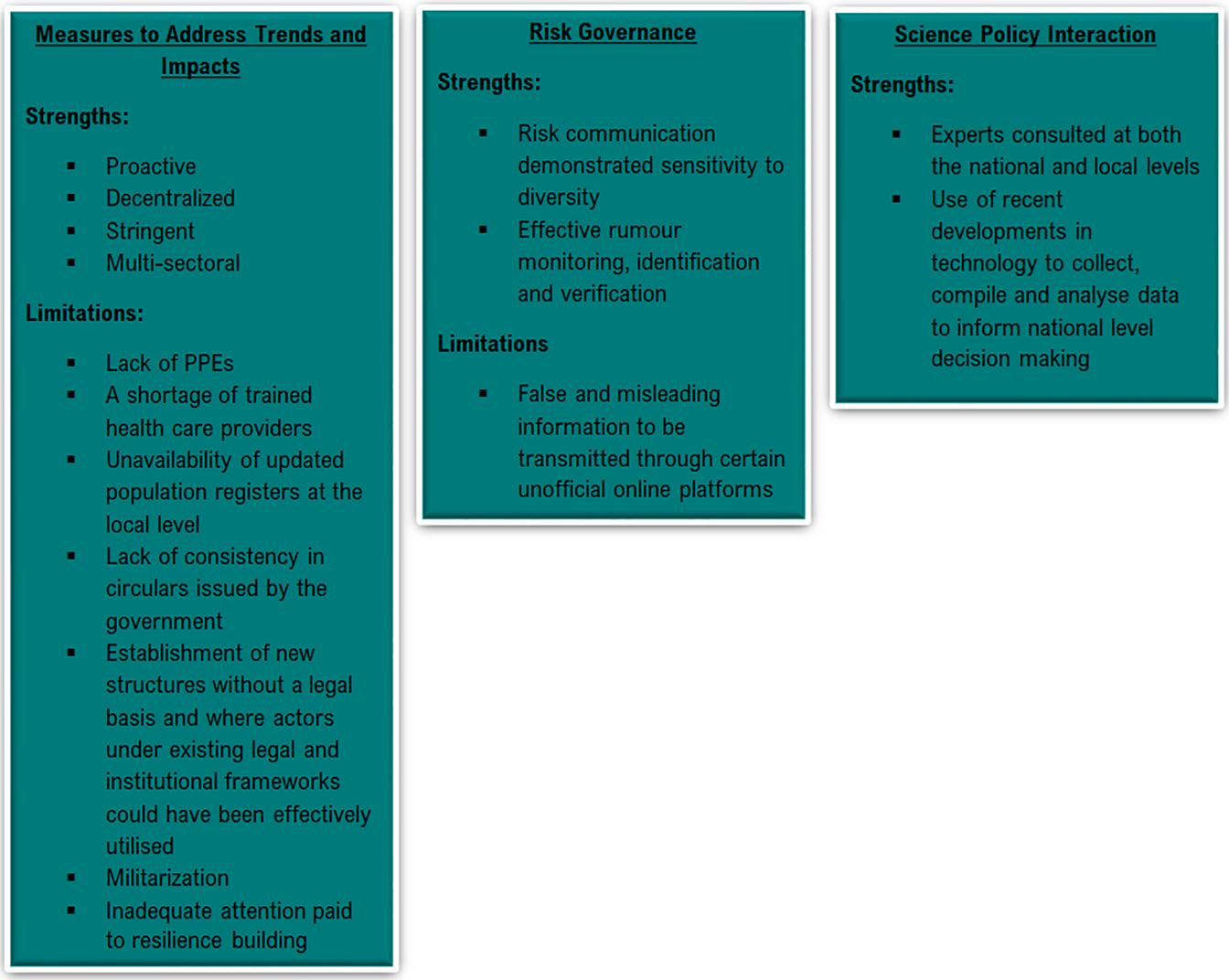

Fig. 2. Sri Lanka's Response to COVID-19: Key Strengths and Limitations.

specifically owing to a decline in new orders, production and employment [6,41]. Further, industrial exports in the country dropped by 74% while agricultural exports declined by 32% on a year over year basis, thereby posing an unfavourable effect on export earnings in the country [41].

In addition to this, it is important to note that private remittances sent by migrant workers to Sri Lanka contribute significantly to the country's foreign exchange earnings [42,20]. For instance, private remittances sent by migrant workers contributed to 63% of total export earnings in the country [20]. However, workers' remittances decreased by 32% in April 2020 thereby posing a negative impact on the country's foreign exchange earnings [41].

Similarly, a recent labour market survey conducted among 2764 private sector establishments revealed that while 1465 establishments were fully closed, 1025 enterprises were functioning under their maximum capacity and only 94 establishments were functioning in their full capacity during the pandemic period [46]. Out of the total number of enterprises involved in the survey, 1084 employers were unable to pay salaries to their workers during the pandemic period in the country. High levels of unemployment, loss of job security and pay cuts resulted in anxiety and economic stress among the population in the country [46].

The impact of the pandemic on Small and Medium Scale Enterprises [SMEs] and the informal sector including daily wage earners was severe [46]. Illustrating this, most SMEs in Sri Lanka were challenged by a shortage of materials to continue production or service provision, decline in local and global demand for their products and difficulties in repaying loans [29].

One of the most pressing issues to be noted in terms of the social impacts of the pandemic is the disruption of educational activities. Lockdown restrictions that accompanied the demands for social distancing resulted in the closure of primary, secondary and tertiary educational establishments [Eg: schools, universities and support classes]. In response, the GoSL promoted continued provision of educational services online [23]. While online education would have been the readily available solution, it has widened inequalities in access to education and fuelled social unrest as some population groups, specifically those residing in rural areas, did not have access to the facilities and infrastructure necessary for online learning [23].

Another social implication that cannot be overlooked is the stigmatization of population groups who were exposed to the public. Certain population groups, like health sector workers and people who served at supermarket counters, were stigmatised in their own communities. This is because they were represented in essential services that continued to be provided despite the pandemic situation in the country, were unable to self-isolate and were thus perceived as potential carriers of the disease (Key informant interviews, 2020).

3.2. Measures taken in response to the evolution and impacts of the pandemic

Sri Lanka's mission of combatting the COVID-19 pandemic was led under the vision of His Excellency the President: 'proactive intervention to prevent any outbreak of COVID-19 within Sri Lanka' [34]. In alignment

with this vision, the Government of Sri Lanka [GoSL] acted well in advance of the advent of the pandemic into the South Asian region. For example, a day before the first confirmed case of COVID-19 was identified in the country, i.e. on 26th January 2020, the National Action Committee for COVID-19 was formed [34]. Consequent to the identification of the first confirmed case, who happened to be a Chinese traveller, the Government of Sri Lanka suspended the issue of visa upon arrival to Chinese travellers from 28th January 2020 onwards [17,18]. Since the reporting of the first local case, the Government of Sri Lanka enforced a quarantine period of 14 days for all travellers who had arrived from or transited through China, Italy, Iran or South Korea. As of 17th March 2020, all entry visas for citizens of Austria, Bahrain, Canada, Denmark, France, Germany, Iran, Italy, Netherlands, Qatar, South Korea, Spain, and Sweden, along with all incoming flights, were suspended as initial measures to curb the spread of the Corona virus [17,18].

Apart from being proactive, the GoSL was also stringent in terms of its measures taken to curb the spread of the virus in the country. Some of these measures include a ban on all public gatherings, closure of all education centres including schools and universities, discontinuation of non-essential services and the enforcement of an island wide curfew with a work from home option for the population across the country [1,36]. While stringent controls like the imposition of curfews, most often followed by the declaration of a 'State of Emergency' are much called for to curtail the spread of the virus, the justifiability of such measures has been contested on the basis of fundamental human rights violations that are closely linked to such measures [11,39]. A 'State of Emergency' represents a situation of exceptional threat, danger or disaster during which the government is vested with extraordinary powers to take rapid measures [not permitted during normal times] to curtail the threat, even if such measures may restrict certain fundamental human rights [3,7,8]. In Sri Lanka, a state of emergency was not declared by the Government in the face of the COVID-19 pandemic [11]. Regardless, the GoSL announced an island-wide curfew on 20th March 2020, approximately one week following the reporting of the first local case of COVID-19. The curfew was implemented as a preventive measure to curb the spread of the virus [17,18,28]. Later the curfew was eased for most districts of the country and was limited to night hours other than in high risk areas like Colombo, Kalutara and Gampaha. Given that no new cases of community infection were reported for almost two consecutive months, the GoSL completely lifted the curfew imposed on 28th June 2020 [28].

Addressing the derogation of human rights associated with the imposition of curfew measures, the Human Rights Commission of Sri Lanka (2020) has questioned the legal basis for the enforcement of an island wide curfew. While the relevant authorities declared that the island wide curfew was imposed in accordance with the provisions of the Quarantine and Diseases Prevention Ordinance of Sri Lanka, the Human Rights Commission of Sri Lanka (2020) asserts that quarantine regulations under said ordinance only allow for the prevention of entry into and exit from 'diseased localities' which refer to areas with infected persons or those suspected of infection as declared by the 'proper authority' who in this case is Director General of Health Services [DGHS] in the country. The Commission questions the legality of extending these powers to declare an island wide curfew. According to the Human Rights Commission of Sri Lanka (2020), a curfew can only be regulated and formalized under the provisions of the Public Security Ordinance No.25 of 1947. While Section 16 in Part III of said ordinance vests the President with the authority to impose curfew and restrict the mobility of citizens 'where the president considers it necessary to do so for the maintenance of public order, the provisions of the same ordinance require the President to seek parliamentary approval of the decision by gazetting the imposition of curfew and disclosing the details of the gazette to the parliament [35]. However, the Parliament of Sri Lanka was dissolved on 2nd March 2020 and the parliamentary elections, which were to be held in April, were postponed to contain the spread of the pandemic. The old parliament was not reconvened until it was safe to hold parliamentary elections [11]. Hence, the provisions of the Public Security Ordinance No.25 of 1947 fail to provide the legal basis for the imposition of an island wide curfew in the absence of a sitting parliament in the country [35].

Another salient feature of the GoSL's response to COVID-19 is the involvement of multiple stakeholders resembling a multi-sectoral approach. Elaborating on this, the GoSL's approach to minimizing the spread of the pandemic broadly focused on four Lines of Operations [LOOs] namely: 1) Military/Police/Intelligence LOO; 2) Medical and Health care LOO; 3) Psychological LOO and 4) Economic and Community Well Being LOO which called for the involvement of diverse stakeholders [34]. The Military/Police/Intelligence LOO was coordinated by the Ministry of Defence and the main stakeholders involved were the State Intelligence Service, Sri Lanka Army and the Police. This LOO was concerned with identifying individuals who have either arrived in the country from contaminated areas or have been exposed to the virus, isolation of these individuals by enforcing measures like self-quarantine or central quarantine in quarantine centres, isolation or complete lock-down of clusters that have been exposed to the virus, and tracing of origins of cases [34].

On the other hand, the medical and healthcare line of operations was predominantly carried out by public health sector authorities in the country. This LOO involved activities like rapid contact tracing of infected persons and detecting positive cases through laboratory confirmation of suspected persons, sampling of associates of positive cases, random sampling of high risk areas or vulnerable communities, and sampling at border control points [34].

Along the same lines, the Ministry of Health and Indigenous Medical Services published the 'Sri Lanka Preparedness and Response Plan COVID-19' on 9th April 2020. The plan was prepared in alignment with the guidelines provided in the Strategic Preparedness and Response plan developed by the WHO. This constituted an action plan to handle clusters of cases [resembling stage 03 of the four transmission scenarios for COVID-19 outlined by the WHO] and to tackle the future possibility of community transmission in the country [36]. The plan consisted of four strategic objectives, namely: 1) Limit human-to-human transmission, including secondary infections among close contacts and health workers, preventing transmission amplification events and preventing further international spread; 2) Identify, isolate and care for patients early, including optimizing care for all patients, especially the seriously ill; 3) Communicate critical risks and event information to all communities and counter misinformation; and 4) Minimize impacts through multi-sectoral partnerships and whole-of-society approach [36]. The country has also been commended for its robust health system and high testing rate in the context of the COVID-19 pandemic [40]. Elaborating on this, Sri Lanka was able to maintain a high testing rate relative to other countries in the South Asian region. For instance, during the months of March and April, the country had conducted 930 tests per 1 million people compared to 393 in Bangladesh, 703 in Pakistan and 602 in India [40].

Under the psychological LOO, the GoSL communicated key messages on behavioural guidelines to be followed by the general public like hand washing, the use of sanitizers and social distancing.

With regard to the economy and well-being of community LOO, the government of Sri Lanka introduced a stimulus package for SMEs for which the government released a fund of LKR 50 billion [approximately USD 270 million]. The stimulus package constituted a working capital loan of up to LKR 25 million [approximately USD 135,000] The loan was targeted at enterprises with an annual turnover of less than LKR 1 billion [approximately USD 5.4 million]. However, when approximately 45,000 private sector businesses applied for this loan, the government realised that the allocation of LKR 50 billion was inadequate to meet the demands, As a result, the government decided to increase the funds allocated up to LKR 150 billion [approximately USD 810 million] [41]. However, based on an analysis of stimulus packages provided in 18 other countries, it has been revealed that the stimulus package provided by the GoSL was inadequate compared to an average of 3.5% of GDP allocated for the provision of stimulus packages in other countries [41].

Apart from this, income tax arrears of SMEs were partially waived off, payment terms were relaxed and legal actions against non-payers were

frozen [21]. Similarly, the government introduced a debt repayment moratorium which included a six-month debt moratorium for affected industries in tourism, garment, plantation and IT sectors and SMEs [21]. As mentioned prior, the GoSL also provided an allowance of LKR 5000 for low income families and economically vulnerable population groups like daily wage earners. The government also introduced a maximum retail price for selected essential items and established a fuel price stabilization fund [41].

Another significant aspect of Sri Lanka's response to the COVID-19 pandemic is the emulation of a decentralised approach to addressing the effects of the pandemic. The Sri Lanka Disaster Management Act No. 5 of 2013 vests powers with District Secretaries and Divisional Secretaries to make independent decisions during a disaster situation, particularly with regard to the provision of emergency relief and related post disaster scenarios. Accordingly, District Secretaries and Divisional Secretaries, together with Grama Niladhari [GN] officers, played a pivotal role in key activities such as distributing an allowance of LKR 5000 [approximately USD 27] among economically vulnerable population groups, providing recommendations for the issue of curfew passes to individuals when required, facilitating the supply of food to the village level, providing pension to pension holders, and ensuring that social order was maintained (Key informant interviews, 2020). While in some districts existing district, divisional and GN level disaster management committees, headed by District Secretaries, Divisional Secretaries and GN officers respectively, were activated, in certain other districts new committees at said levels were formed and functioning. The decisions taken at the district committee meetings were implemented via divisional and GN level committees. Further, the District and Divisional Secretaries, in collaboration with the Assistant Directors of District Disaster Management Coordinating Units [DDMCUs], were able to draw in donations and aid from the private sector, including large scale corporations and NGOs to carry out said activities at the local level (Key informant interviews, 2020). This approach has enabled the effects of the pandemic to be addressed in a contextualised manner by resolving problems and leveraging resources that are local to a particular area.

However, several challenges were posed at the sub-national level. For example, a lack of updated information on village population at the local level made it challenging to accurately identify beneficiaries for the provision of relief services [Eg: LKR 5000 allowance] at the sub-national level. Additionally, there was lack of consistency in circulars issued at the national level with regard to the provision of relief services, which in turn made the accurate listing of beneficiaries arduous (Key informant interviews, 2020).

4. Risk governance

4.1. An outline of COVID-19 risk governance in Sri Lanka

The Quarantine & Prevention of Diseases Ordinance chapter 222, No.3 of 1897 makes provisions for the prevention of the introduction of the plague and all other contagious and infectious diseases into Sri Lanka and the prevention of the spread of said diseases within and outside of Sri Lanka [26]. In most regulations framed under this Ordinance, the Director General of Health Services [DGHS] has been assigned as the proper authority for facilitating the prevention of the spread of said diseases [26]. The Ministry of Health and Indigenous Medical Services is headed by the DGHS [16]. Against the provided legal framework, the DGHS chaired regular meetings with Deputy Director Generals, Directors and the Chief Epidemiologist to assess the COVID-19 situation in the country. Instructions to implement the decisions taken at these meetings were given by the DGHS under ordinances, acts and laws of parliament vested under the purview of the DGHS [36].

The national public health emergency mechanisms were activated under the purview of the DGHS to respond to the COVID-19 pandemic in the country. Elaborating on this, the Disaster Preparedness and Response Division [DPRD] of the Ministry of Health and Indigenous Medical Services functioned as the overall country level coordinator for the health sector, coordinating all activities in the Ministry of Health including surveillance and cases investigation; infection prevention and control, Points of Entries [POEs]; case management; risk communication and community engagement and operations support and logistics during the COVID-19 pandemic in the country [36]. Further, various stakeholders under the Ministry of Health and Indigenous Medical Services acted as focal points of the activities mentioned above. For example, POEs were managed by the Quarantine Unit, while the Medical Research Institute [MRI] played a key role in surveillance and cases investigation through PCR testing and the responsibility of hospital based case management was vested with hospitals where the central role was played by the National Institute of Infectious Diseases [NIID] [36]. Additionally, the DPRD was responsible for the intra-sectorial coordination with Ministry of External Affairs, Consulates of Countries, Civil Aviation Authority, Airports, Airport Aviation Services Limited, Ministry of Defence (Tri-forces, Police and STF), Department of Customs, Department of Immigration and Emigration, Ministry of Finance, Ministry of Defence, Disaster Management Centre, Ministry of Ports and Shipping during the COVID-19 pandemic situation in the country [36].

Apart from this, the GoSL established the 'National Operation Centre for Prevention of COVID-19 Outbreak [NOCPCO]' as the national body for spearheading the management of the COVID-19 outbreak, the necessary health care provisions and relevant public services in the country. The Centre was headed by the Chief of Defence Staff and Commander of Army [32,33]. Media briefings regarding the updated situation on the virus in the country were held regularly at the NOCPCO. These briefings were represented by the Head of the NOCPCO and the DGHS. Apart from these regular media briefings, status updates on the pandemic situation [Eg: the number of positive COVID-19 cases] were made available to the general public by the NOCPCO via the President's Office and the Government Department of Information [32,33]. This demonstrates a considerable degree of transparency and accountability in GoSL's response to the COVID'19 pandemic.

In addition to the NOCPCO, three task forces were appointed by the President to address the deleterious cascading effects of the pandemic. One of the task forces was appointed on 26th March 2020 by way of Gazette Extraordinary No. 2168/8 and was vested with extensive powers direct, monitor and coordinate the supply of essential services and to ensure the sustenance of overall community life in the context of the COVID-19 pandemic in the country [7,8,34,37,38]. This task force consisted of a total of 40 members and included Provincial Governors, Secretaries to Ministries, security chiefs, heads of various departments, corporations and authorities, commanders of tri-forces and district and divisional secretaries. The activities that this task force was responsible for included but were not limited to providing facilities for farmers to continue agricultural production, ensuring an unhindered supply of food, facilitating the distribution of medicines and coordinating with relevant authorities [Eg: Ports, Customs and corporate banks] to import dry rations and medicine into the country and the distribution of the LKR 5000 grant to low income families [37,38]. Apart from this, two other task forces were appointed, one of which was concerned with reviving the economy and eradicating poverty and the other to ensure the uninterrupted provision of educational services during the pandemic situation. The Task Force for Economic Revival and Poverty Alleviation was established by way of Gazette Extraordinary No. 2172/9 on 22nd April 2020 while the Task Force for Sri Lanka's Education Affairs was formed by way of Gazette Extraordinary No. 2173/7 on 28th April 2020 [7,8].

4.2. Risk communication during the pandemic: processes, tools and related failures

The Health Promotion Bureau of the Ministry of Health and Indigenous Medical Services served as the focal point for island wide risk communication during the COVID-19 pandemic. The risk communication network was led by the Ministry of Health and Indigenous Medical Services with the support of the WHO and UNICEF. The Epidemiology Unit, Health Promotion Bureau and the National Operations Centre for Prevention of COVID-19

Outbreak [NOCPCO] played a key role in this regard [36]. Medical Officers of Health and the WHO Sri Lanka engaged in active rumour monitoring to ensure the accuracy and reliability of information provided.

Information on aspects like the nature of the virus, the status of the pandemic in the country and advice on aspects such as preventive measures were communicated to the public using a variety of measures [36]. Risk communication messages were delivered to the public using mass media like TV stations and other media like mobile communication networks [19,36]. Apart from this, risk communication was performed through daily press briefings, situation reports and FAQs. Additionally, social media constituted a significant mode of formal risk communication. For instance, an official Facebook page with over 40,000 followers and a Twitter account with over 10,000 followers were maintained to communicate vital information regarding the pandemic risk to the public. In addition to this, a Viber group and a YouTube channel were utilised for communication of risk to the public.

Further, an official website for the GoSL's response to the COVID-19 pandemic was launched by the Ministry of Defence [25]. The website provided various information such as the latest news on the pandemic situation in the country, up-to date statistics [Eg: the number of confirmed cases, active cases, recovered cases and deaths], Corona related guidelines and circulars, contact details of quick response health lines etc. Website content was sourced from various organizations including the President's Media, the Health Promotion Bureau and the Department of Government Information. The site can be accessed through the following link: https://covid19.gov.lk/. The website was designed and launched with the objective of providing the general public with convenient access to accurate and updated information on the global and local status of the pandemic [25].

A 24/7 trilingual hotline named 'Suwasariya' [number – 1999] was also made available to the public for any enquiries [19,36]. Simultaneously, updates on the Corona Virus situation in the country and information on preventive measures were displayed on a tri-lingual website maintained by the Health Promotion Bureau [19]. In addition to this, Information, Education and Communication [IEC] material including pictograms, leaflets, stickers and posters were designed and printed in all three languages – Sinhala, Tamil and English – and displayed at appropriate locations. The efforts made to carry out risk communication in all three languages demonstrates sensitivity to language differences among various ethnic groups in the country and the inclusivity of the GoSL's approach to risk communication.

The Health Promotion Bureau also liaised with provincial and district level health authorities like the Provincial and Regional Directors of Health; Health Education Officers and Community Physicians at sub-national levels to ensure that risk communication reached the grass root level [36].

However, there was a tendency for false and misleading information to be transmitted through certain unofficial online platforms [Eg: news websites and social media platforms like private Whatsapp groups and private Facebook pages]. For example, a list of COVID-19 preventive measures purported to have been issued by the country's Infectious Diseases Hospital [NIID] was published in an article on an online news website. This went viral via private Whatsapp and Facebook accounts. However, the public was subsequently made aware that the NIID had not issued the mentioned set of guidelines and that the public should rather adhere to the set of approved guidelines [2]. Although, there was a tendency for false and misleading information to be transmitted via unofficial online platforms, such information did not cause a significant change in public behavioural trends. This is because transmission of fake information was effectively controlled and managed as rumour identification and management was identified as an essential component of overall risk communication by the Health Promotion Bureau. In this regard, the Health Promotion Bureau carried out rumour monitoring, identification and verification activities through a 24/7 call centre, social media analysis and mass media analysis [36].

4.3. Accounting for compound events and specific vulnerabilities

There is an urgent need to rethink the current approaches to preparedness planning and response to other hazards which may occur concurrently in the context of the COVID-19: 'new normal'. The occurrence of other hazards [whether sudden or slow onset events] amidst the pandemic gives rise to new complexities and compound vulnerabilities. This may require the tailoring of preparedness and response activities for such hazards to address the novel challenges posed by the pandemic. Demonstrating this, some districts in the country had to execute disaster preparedness activities for the Southwest Monsoon during the COVID-19 pandemic and these activities had to be configured accordingly (Key Informant Interviews, 2020). For instance, the district of Ratnapura was faced with a high risk of floods and landslides with the onset of the Southwest monsoon. Hence special attention had to be paid to how such preparedness activities for potential floods and landslides could be carried out while containing the spread of the pandemic within the district. Some important measures were taken in this regard (Key Informant Interviews, 2020). For example, while in other years families residing in flood prone areas were evacuated to safety houses, steps had to be taken this year to reduce the number of safety houses as far as possible and evacuate vulnerable families to the houses of their relatives/friends. While around 500 people who resided in flood prone areas were directed to the homes of their relatives or friends, only 19 safety houses were maintained in the district. Further, before people were registered at a safety house, they were checked for fever by local level health authorities like Public Health Inspectors and the Public Health Midwives. If a person was diagnosed with fever, they were admitted to a hospital and were thus, not registered at the safety house. In addition to this, movement of people into and out of the Safety Houses was strictly restricted. Social distancing was maintained in the safety houses and facilities like masks and sanitizers were provided to the occupants. Apart from this, those families who had to be self-quarantined and were also residing in flood and landslide prone areas were separately identified and evacuated to separate places. Community centres and closed schools were used for this purpose (Key Informant Interviews, 2020).

On the other hand, it is important to note that while COVID-19 is a global disaster, some of the vulnerabilities created can be largely specific to certain regions, countries or localities. A case in point is the vulnerability experienced by migrant workers of Sri Lanka. Elucidating this, the International Labour Migration from Sri Lanka has surged over the past three decades, particularly consequent to the adoption of open economic policies in 1977. There are over a million Sri Lankan residents who work abroad and the annual reported migrants amount to approximately 200,000 persons [20]. Many of these migrant workers, including students who had migrated overseas for study purposes, were stranded without employment and thus, financial capacity to meet their basic needs like food and shelter during the COVID-19 pandemic period. Given that Sri Lanka closed its borders to prevent an influx of imported COVID-19 cases, the GoSL was responsible for repatriating its citizens who had been stranded abroad [4]. Given this background, Sri Lanka faced an increased risk of the virus from imported cases, particularly from migrant workers and Sri Lankan students who were looking forward to returning to their home country [27]. Nevertheless one of the conditions for repatriating these workers was the adequate availability of quarantine facilities. Therefore, the chances of this risk being materialized were low [27].

5. Science-policy interaction

5.1. Mobilization of scientific expertise and evidence in responding to the pandemic: ways and concerns

Since the 1990s, the practise of evidence based policy making has been advocated by both governments and scholars with the intention of improving policy outcomes. Evidence based policy making calls for basing policy decisions on scientific expertise and rational analysis so that the extent to which sources of bias like ideology, value judgements and political expediency are reflected in policy making is minimized [5,10]. This section of the paper evaluates the extent to which the policy decisions made during the COVID-19 pandemic in Sri Lanka had been informed by scientific expertise and evidence. Primarily, the GoSL consulted medical specialists for

technical guidance and advice in planning its response to the outbreak in the country. Meetings were held with specialist medical professionals including the Director General of Health Services [DGHS], the President of the Association of Medical Specialists [AMS] and other medical consultants [37,38]. At these meetings recommendations and proposals on the effective control of the spread of the COVID-19 pandemic were presented to state representatives like the Minster of Health by said health authorities [37,38]. Further, at the sub-national level District Disaster Management Committee meetings were held in most districts to plan district level responses to the pandemic. These meetings were chaired by the respective District Secretaries and convened by the Assistant Directors of District Disaster Management Coordinating Units. The meetings were represented by the Regional Directors of Health Services who provided the necessary technical guidance on the measures to be taken to curb the spread of the virus (Key informant interviews, 2020).

Apart from this, data collection, compilation, analysis and reporting pertaining to epidemics and pandemics in the country are carried out through a disease surveillance system [26]. The disease surveillance system facilitates a hierarchical flow of information from sub-national level public health authorities like hospitals, Medical Officers of Health [MOH], Regional Directors of Health Services [RDHS] to national level public health authorities cum institutions that include the Epidemiological Unit, the Deputy Director General of Public Health Services and the Director General of Health Services. The surveillance of communicable diseases in the country, including communicable epidemics and pandemics, is supported by a Notification System designated to provide notifications on diseases identified in the 'List of Notifiable Diseases' in the country [15,26].

During the COVID-19 pandemic period in the country, the Epidemiology Unit of the Ministry of Health and Indigenous Medical Services functioned as the focal point of disease surveillance and reporting of data pertaining to the virus situation in the country [36]. Elaborating on this, the Ministry of Health and Indigenous Medical Services issued a circular to all hospitals declaring COVID-19 as a 'notifiable condition' and setting out the requirement for the mandatory notification of COVID-19 cases to the Epidemiology Unit [45]. Upon the receipt of notifications from all hospitals, the Epidemiology Unit compiled daily situation reports. In these reports, data pertaining to the total number of confirmed cases [both imported cases and local cases], the total number of deaths, the number of recovered cases and the total number of suspected cases were reported [14]. The reports were shared with the DGHS and other relevant officers at 10 am on the following day [36].

It is also important to note that an integrated information system named the 'the National COVID-19 Surveillance System' was established by the Ministry of Health and Indigenous Medical Services as a platform for COVID-19 designated hospitals to enter their daily resource review, individual case information, data on equipment requirements and laboratory information. Specific deadlines for entering the data were also established. The data gathered through this system was used for decision making and media briefings by the Ministry of Health and Indigenous Medical Services [36].

Further, the Epidemiology Unit produced a weekly update on the global situation of the pandemic sourcing data from the WHO. Both the daily report on the local pandemic situation and weekly global report were made available on the Epidemiology Unit's official website. The Epidemiology Unit also sourced articles form journals, the WHO, Centre for Disease Control and Prevention [CDC] and other reliable institutional sources. Such data was archived in the web to be used by interested parties [36]. In situations where cases of community transmissions were identified and reported, the Epidemiology Unit monitored aspects such as the geographical spread of the virus, disease trends, transmission intensity, characterization of virologic features and impacts on health care services [34].

Furthermore, collection of relevant data and analysis of such data was vital for detecting vulnerable communities and tracing case origins to assist decisions on imposing lockdown, isolation, central quarantine and self-quarantine measures on individuals and communities [34]. Elucidating this, vulnerable communities were detected using mechanisms like big-data analysis and verification of records with agencies like Immigration and Emigration and voter registration. On the other hand, tracing of case origins was carried out through big-data analysis, performing record checks, analysis of boarder control data and reference to information from sources like Telcos and hotel reservations. Collection and analysis of data pertaining to detecting and tracing were conducted with the dominant involvement of stakeholders such as the State Intelligence Service, Police Special Branch and the Directorate of Military Intelligence [34].

Similarly, the Health Information Systems Program [HISP] of Sri Lanka introduced the District Health Information Software – DHIS2 Tracker for surveillance of COVID-19 pandemic in the country (dhis2, 2020). The software was used to track and register travellers coming into Sri Lanka from countries with a high risk of COVID-19. The software enabled the entry and analysis of individual level data which could be eventually aggregated for national reporting purposes. Further, a DHIS2 custom web app was developed which allowed for the visualization of the potential spread of the virus across a cohort of cases and their contacts. Such visualization of data was used to inform public health interventions and epidemiological investigations [13].

6. A summary of Sri Lanka's response to COVID-19: key strengths and limitations

The Government of Sri Lanka's [GoSL's] response to the pandemic could be viewed as proactive. Relevant steps were taken in advance of the advent of the pandemic into the South Asian region. Further, the GoSL emulated a multi-sectoral approach to tackling the pandemic with the involvement of diverse stakeholders ranging from various institutions under the purview of the Ministry of Health and Indigenous Medical Services, the military, police, sub-national level government officers to the private sector. Apart from this, the effects of the pandemic situation were managed in a decentralised manner, whereby sub-national level administrative authorities, like District and Divisional Secretaries, were able to make independent decisions to resolve endemic local issues and draw on local resources, thereby contextualising their response to the local pandemic situation. Sri Lanka has been able to utilise its robust health system to respond to the pandemic situation effectively. Risk communication was effective and there were no significant concerns regarding reliability of data communicated. Rumour identification, verification and monitoring were identified as essential components of risk communication. Recent developments in technology were adopted to collect, compile and analyse data to inform national level decision making with regard to curtailing the spread of the virus. Steps have also been taken towards immediate response to adverse economic and social impacts of the virus.

However, lack of Personal Protection Equipment, a shortage of trained health care providers, unavailability of updated population registers at the local level and lack of consistency in circulars issued by the government, have stood as some of the major challenges to the country's response to the pandemic. Further, steps taken by the government to establish new structures without a legal basis and where actors under existing legal and institutional frameworks could have been effectively utilised, remain unjustified. The GoSL's reliance on institutions with political interests for technical guidance and advice, as opposed to policy making institutions, is questionable. Similarly, stringent measures such as police curfew imposed when an emergency situation was not declared by the GoSL, raises human rights concerns. In addition, the disproportionate involvement of military personnel in the GoSL's multi-sectoral approach to tackling the pandemic has been criticised for being indicative of militarization of the government's response to the pandemic. Furthermore, the GoSL's efforts to address economic and social effects of the pandemic have been predominantly geared towards emergency relief and response. Adequate attention has not been paid to building social and economic resilience.

7. Conclusion

This paper has examined Sri Lanka's response to COVID-19 paying specific attention to three aspects: 1) trends and impacts, 2) risk governance and 3) science-policy interactions. Measures taken to address the trends

and impacts of the pandemic can be commended on the basis that they had been proactive, multi-sectoral, decentralised and stringent. In terms of risk governance, the Ministry of Health and Indigenous Medical Services, as the accountable authority, had taken measures to enhance not only the reliability but also the inclusivity of risk communication. The tendency for compound events and specific vulnerabilities establishes the need for a multi-hazard and localized approach to pandemic risk governance in the country. With regard to science-policy interactions, political decision making of the government had been informed, to a significant degree, by scientific expertise and evidence.

However, limitations in physical, human and information resources; lack of consistency in government's decision making; establishment of haphazard structures; short term orientation prioritizing emergency relief and concerns raised regarding militarization and human rights violations hint at the lack of preparedness for pandemics and the absence of a national framework to guide such preparedness in Sri Lanka. The findings of this paper lead to future lines of inquiry in the field of Disaster Risk Management, providing impetus to delve into: 1) the current status and gaps of pandemic preparedness in Sri Lanka; 2) economic and social resilience building in the context of pandemic preparedness; 3) the role of the private sector in preparing for pandemics: the current status and areas for improvement; 4) ways of fostering community participation in pandemic preparedness and response and 5) the current status and gaps concerning preparedness for compound events.

Author statement

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Declaration of Competing Interest

None.

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[4] *Attanayake C. Repatriating Migrants during COVID-19: Challenges for the Sri Lankan Government. (Institute of South Asian Studies brief 6 June (789)). Singapore: National University of Singapore; 2020 (Attanayake discusses the complexities and dilemmas associated with the decision making of the Sri Lankan government to repatriate Sri Lankans who have been stranded abroad during the pandemic. The author reveals the measures taken and the criteria followed by the Sri Lankan government in repatriating its citizens from other countries. The author argues that while it's the responsibility of the Sri Lankan government to protect its citizens, complexities associated with a decision to repatriate should be considered. Some complexities include the increased risk of imported cases and challenges surrounding foreign relations. Attanayake therefore claims that repatriation of citizens is a calculated risk during a global crisis like COVID-19).

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[46] *Wimalaweera A. Covid 19 & Beyond- The impact on the Labour Market of Sri Lanka SURVEY REPORT OF THE *E*-SURVEY CONDUCTED ON PRIVATE SECTOR ESTABLISHMENTS –MAY 2020. Colombo: Department of Labour Sri Lanka; 2020, http://www.labourdept.gov.lk/images/PDF_upload/notices/survey%20report%202020.pdf (accessed 30 August 2020 Wimalaweera examines the impact of the COVID-19 pandemic on the labour market of Sri Lanka, providing useful insights into economy related effects and economic vulnerability caused by the outbreak. The author points out that the challenges posed by the pandemic on the labour market of Sri Lanka are similar to those faced by most other countries across the globe. Supported by an e-survey conducted across 2764 formal private sector establishments in the Colombo district of Sri Lanka, the study reveals an increase in pay cuts and business closures. The author claims that overall effects of the pandemic on the labour market of the country hints at rising unemployment in the near future. The study also identifies that the ability of a business to function fully during the pandemic period, total employment during said period and ability to make payments to employees in the future vary according to the size of the business. On this basis, the author proposes that interventions for business revival be tailored to meet industry-specific needs and vulnerabilities. Wimalaweera also provides short and medium term recommendations for effectively overcoming the challenges imposed by the pandemic on the labour market of Sri Lanka.).