POLICY BRIEF

Disease emergence and environmental diplomacy in the Indo-Pacific region

EXECUTIVE SUMMARY

Objective: Disease emergence and management are matters of environmental security, because they impact Defence by decreasing the workforce and deployment capability. There can also be cascading social and political impacts that can lead to international security threats. Additionally, a lack of security is a known driver of disease spread and the Defence sector is responsible for mitigating disease threats through infrastructure, logistics and deployments. This brief aims to prompt proactive measures and bolster the Defence sector's capacity to address environmental threats and mitigate disease risks.

Method: We provide a DPSIR framework for analysing risks related to emerging infectious diseases and national security.

Findings: Most emerging infectious diseases (EIDs) are transmitted to humans from other species. This 'spillover' is increasing, because of human-related factors such as the wildlife trade, climate change, land use change and intensive agriculture. Prevention at the source is the most economical and effective use of resources. This involves environmental conservation, addressing social disparities, and enhancing our Indo-Pacific region neighbour's abilities to detect and respond to EIDs.

Recommendation: We recommend against the increased securitisation of health and instead suggest a whole-of-government approach to soft diplomacy in the IPR.

THE HEADLINES

1. Emerging infectious disease is a matter of national security, a matter often overlooked in Defence Sector policy.

2. Disease emergence, its drivers and consequences in the Indo-Pacific region is a multi-faceted 'wicked problem' that requires multidisciplinary and inter-agency cooperation.

3. The DPSIR framework is a valuable tool for examining the risks of disease spillovers and formulating policy responses in the complex context of the IPR.

4. Increased securitisation of health in the IPR should not be the primary policy response, but instead, supporting prevention at the source by way of environmental diplomacy is an appropriate and necessary policy response for the Defence sector.

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Emerging infectious diseases (EIDs) have led to prolonged humanitarian crises and regional conflicts that have required military, defence, and security assistance and engagement. Disease emergence and contagion can reduce the capability of defence services to effectively respond to threats, and disease emergence in itself has the potential to have cascading impacts that can lead to international security threats. A lack of security is a known driver of disease spread and affects the ability to control the size of an outbreak. Additionally, disease outbreaks can enhance social and cultural tensions or be seen as 'opportunities' for insurgent and rebel groups in an area. Prevention of these causal chains requires both prevention of the drivers of insecurity, and the drivers of EIDs. Most new EIDs are of animal origin with spillover events to humans, that are then spread via human-to-human transmission. Zoonotic diseases are those passed from animals to people, often through an intermediary host. Vector-borne diseases are transmitted to people from other living things.

- Zoonoses are commonly cited as responsible for 60-70% of infectious diseases in humans, however the **vast majority are no longer zoonotic**, but transmitted between infected and susceptible humans.
- Vectors are responsible for 17% of all infectious diseases and **kill 400,000 people every year**.
- The rate of emergence of infectious diseases is increasing, with **more than five new diseases of zoonotic origin emerging in people every year**.

As with most health issues, EIDs have macro-level drivers that are determined by the cultural, political, economic, and environmental dynamics of the area of emergence. Human-induced environmental changes are responsible for the increase in rates of EIDs. As well as environmental drivers increasing spillover events, we are seeing social, cultural, and political settings increasing the risk of another major pandemic. Many of the drivers of the emergence and spread of disease are also drivers of insecurity, such as poverty, population density and climate change. New diseases most often emerge in global biodiversity hotspots, many of which are in the IPR. **This brief shares findings from the research with the aim to inform policy responses by decision-makers in the Defence and Security sectors.**

METHOD

The DPSIR framework is a methodology for evaluating sustainability in diverse settings to show the cause–effect relationships between environmental and human systems and is applied to scenarios with diverse socio-ecological interactions. The DPSIR model requires the integration of social, economic, political, and environmental information to understand resulting societal changes and to plan appropriate responses.

It is based on a concept of causality, where social, demographic, and economic developments in society **drive (D)** human activities that **pressure (P)** the environment, changing the **state (S)** of resources (the quantity and/or quality). The change has negative **impacts (I)** on society and the environment, to which society **responds (R)** with adaptive, preventive or mitigative actions that may or may not alleviate the drivers and pressures.

The framework involves providing a comprehensive description of a system by developing a set of indicators.

RESULTS

Drivers

The common drivers of pressure on ecological systems include population growth, economic and socio-political systems, the use of fossil fuels, deforestation, urbanisation, increased contact between humans and animals, and an increase in intensive animal agriculture. We differentiate between direct and indirect drivers.

Direct drivers that increase the human-animal interface are also drivers of EIDs. Drivers interact and reinforce one another. For example, deforestation drives EID because it results in forest fragmentation, which in turn reduces wildlife habitat and displaces species, often into agricultural spaces, human-settled or urban areas. People and livestock are directly exposed to pathogens that exist in species within the previously forested area. What the land is converted to, and how humans interact with it post-deforestation, is key in determining its influence on EIDs.

The most obvious **indirect driver** of disease emergence is human population growth and its accompanying impacts. Population growth (i) enables greater EID transmission, (ii) necessitates agricultural expansion, (iii) enhances urbanisation and encroachment on native environments, (iv) leads to a greater number of invasive species, and (v) enhances human mobility, all of which indirectly drive disease emergence. As evidenced by the recent COVID-19 pandemic, densely populated areas allow for increased rates of transmission and therefore pose a heightened disease risk. These risks are compounded in areas experiencing the effects of natural disasters, inadequate sanitation, or heightened pollution, due to similar underlying principles. Agricultural expansion is necessary to support growing populations, however it is widely known to compromise local ecosystems and contribute to antibiotic resistance and is associated with zoonotic disease spillover in Southeast Asia. And in the context of climate change, wildlife species are already suffering habitat scarcity, meaning that human expansion into these areas function to increase the human-wildlife interactions and thus disease emergence.

Pressures

Pressure indicators are the result of driver indicators, that manifest in a change in environmental, social, or political systems. Examples include CO2 emissions per sector, viruses being transmitted and the introduction of pests and weeds. Various EIDs have already been linked to several pressure indicators. Declining biodiversity due to land use change is closely related to risk of EID. It has also been shown that conserving biodiversity provides protection from infectious disease emergence. Anthropogenic emissions lead to altered climatic conditions, rising sea levels, and changes in ocean surface pH levels, all contained under the umbrella of 'climate change'. These resultant pressures amount to habitat disruption on a biodiversity level, and further inadvertently drive changes in disease emergence.

States

State indicators can include the quality of an ecosystem, the taxonomy of wildlife present and their susceptibility to disease, a food production system, virus spillover rates, and the total number of bushfires, floods, and other natural disasters in the locale. The Asia-Pacific is an area of great biodiversity decline, with Indonesia, Malaysia, Philippines and PNG home to thousands of critically endangered species, and Vietnam, Thailand and Indonesia facing over 15,000 threatened animal species.

The IPR is a hotspot for EID outbreaks. Between 2003-2019, there were eight known outbreaks, including SARS, H5N1, H1N1, and ZIKA. Public health responses to the COVID-19 pandemic by several IPR countries have largely proven effective to limit viral transmission, especially due to recently improved surveillance systems. Surveillance mechanisms, laboratory capacity, and trained health personnel were lacking in the IPR. There are calls for integrated, digitised testing and surveillance systems in IPR countries to improve the nature of health surveillance and emergency responses within the region. Porous borders contribute to reduced biosecurity measures, resulting in a region where the containment of disease outbreak is challenging.

It is important to draw on meta data sources to examine countries in the IPR for their social variables such as stable government, high population density, medical capacity, and surveillance capacity. Useful sources include UN's Human Development Index (HDI), the World Bank's records on population density, the UN's Sustainable Development Report, and the World Health Organization's (WHO) Joint External Evaluation (JEE). Measuring the state of the environment data in the IPR highlighted data gaps.

Impacts

Impacts can occur across social, economic, political, and ecological systems. Examples include a lack of adequate conditions for health, resources becoming scarce, and ecosystem destruction and extinction.

A series of cascade events may lead to the engagement of security, military and defence sectors, i.e., in the IPR outbreaks of SARS, H1N1, H5NI and Zika have occurred in areas continuously affected by endemic infectious diseases such as tuberculosis, HIV/AIDS, and malaria and with the persistent risk of antibiotic resistance. Together, these impacts cause greater disruption to social and economic stability. COVID-19 had profound disruptive effects including greater inequality, food insecurity, increased levels of poverty. Links between disease and threats to peace have been observed with HIV/AIDS acknowledged by the UN Security Council as a threat to global peace and security.

Once a disease has become widespread, there can be cascading impacts on social stability, political and structural stability, and economic stability, each of these can interact and exacerbate the other.

Responses

Some responses may lead to further negative driving forces and impacts, as all categories are connected via feedback loops, while others will positively address change at various levels throughout the cycle. COVID-19 demonstrated the level of defence involvement in health-related activities post a disease outbreak. Defence-led responses ranged from providing technical or strategic assistance depending on needs, capabilities and capacities of State's healthcare systems and the defence itself. Various States within the IPR had Defence-led responses, rather than combined defence civilian responses. The sector does play a role in prevention and preparedness, outside of direct response; for centuries Defence has supported vaccine research and development to protect serving personnel from infectious disease risks and promote national security. Vaccines developed by Defence are used to address EIDs in local populations in endemic areas, i.e., Japanese Encephalitis and Yellow Fever.

DPSIR Indicators for Disease Emergence Risk Analysis and Decision-Making

Drivers (human)	Pressures (environment)	State (measurement tool)
Direct anthropogenic drivers	Climate change	Population Density (animals)
Bushmeat/wild meat markets	Contact between people and animals	Population Density (humans)
Intensive animal agriculture	Deforestation	Ecosystem diversity
Unregulated backyard farms	Habitat destruction and degradation	Taxonomy of present wildlife
Wildlife trade	Anti-microbial resistance	Susceptibility of animals to disease
Land clearing for household fuel	Invasive species	Virus spillover rates
Land clearing for development	Land use change	Governance systems
	Viral infection prevalence	Inequality levels
	Decrease in species diversity	Climate change resilience
Indirect anthropogenic drivers		Deforestation levels
Tourism growth		Forest (ecosystem) integrity
Urbanisation		Sanitation systems
Mining		Access to clean water
Agricultural expansion		Invasive species densities and arrival rates
Development		Health centre/hospital capacity
Consumption of fossil fuels		Healthcare access
Population growth		Livestock numbers and conditions and connectivity networks
Globalisation		Reservoir host abundance
Overuse of antibiotics		Pathogen diversity and dynamics
Social inequality		
Political and Social Instability		
Insecurity		
Food insecurity		

Impacts	Responses
Widespread disease can (and has) lead to…	Surveillance programs
	PPE development, stockpiling & distribution
Social Stability	Vaccine development & distribution
Difficulty in accessing health care	Infringements on human rights?
Increased infant and elderly mortality	Information/misinformation
Women burdened with increased care roles	Defence support for provision of facilities and resources
Increased inequality and poverty	
Increased gender-based violence	Prevention measures
Disinformation (i.e., vaccinations, care of sick, burial, witchcraft)	Defence develop relationships
Political and Structural Stability	
Lack of infrastructure and resourcing to contend with outbreaks	
Lack of trained workforce	
No systems for disposing of bodies	
Political instability/coup/corruption	
Confusion and lack of coordination with disaster response	
Economic Stability	
Diverted public monies	
Economic instability	
Poor ease of doing business/trade decline/difficulty getting credit	
Recession	
Food Security	
Loal food markets close	
Lack of availability of and access to staple food	
Farmers need to destroy livestock	
Impacts on global food chains	

WHAT CAN BE DONE

Response, Support, and Intervention

Defence sectors' involvement might include:

- supply chain logistics, communication support, intelligence services, and the use of technologies such as GIS mapping and drone surveillance.
- assisting in establishing facilities like mobile hospitals, engineering support, aid delivery, and enhancing diagnostic and laboratory capabilities.
- conducting surveillance for emerging threats and assisting with vaccine development and trials.
- assisting with Joint External Evaluations, national implementation programs and national Action Plans for Health Security.

However when States turn to Defence sectors for assistance with disease outbreaks, they usually do in a situation where they lack understanding of what that assistance should look like to establish parameters to involvement. Trust in non-culturally aligned authorities during such events is generally low. An alternative to security policies that prioritises resolution of conflict is a people-centred or human rights-based approach to human security. This involves considering sociocultural context (including perceptions/past experiences of the defence force), gender-based risks, and people in vulnerable situations, and is achieved by analysing global statistics, local knowledge and experience, to develop collaboratively with partner governments proactive approaches during peace time. It is in these ways that relationships are developed to build frameworks for the ways in which Defence sectors can assist in EIDs.

Implications

Typically, prevention might mean threat or risk assessment, biosafety, biosecurity, counterproliferation or deterrence, but for the purposes of preventing EIDs, we use the term 'deep prevention', aiming to prevent the disease emerging from the source by focusing on the drivers of emergence and spillover, rather than preventing spread once a disease has emerged.

While policies and strategies that focus on deep prevention ensure that health security takes a holistic, environmental, and people-centred approach to emerging infectious diseases, it also makes financial sense. The economic benefit of deep prevention is estimated at $10-31 billion per year globally, with significant co-benefits including associated social benefits, reduction of health costs and recession risk.

RECOMMENDATIONS

1. Defence and national security policy may wish to consider a move away from health securitisation in the IPR, to instead coordinate with organisations already on the ground and focus on long term promotion of strategic dialogue, trust and friendship through collaborative research and information sharing.
2. Supporting prevention involves environmental conservation: addressing the anthropogenic drivers of environmental change that lead to the ecological processes linked to EIDs. This requires a shift in resourcing from reactive engagement to proactive conservation policymaking.
3. Environmental diplomacy can supplement Defence sector assistance with EID response to play a vitally important role in the geopolitics of Indo-Pacific region. This type of soft diplomacy allows for the type of institution-building in countries that make outside defence assistance unnecessary.
4. Knowing where and when disease spillovers are likely to occur is key to prevention. The Defence sector may support cross-scale mapping that considers the various drivers of disease emergence, to successfully fill data gaps, design policy and make decisions that prevent transmission at the source.
5. A whole-of-government approach establishing effective One Health governance domestically can lead to better multisectoral collaboration with regional neighbours, establishing trust and building long-term relationships.

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