



# ISSUE BRIEF

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## Silent Killers: Biological Warfare



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As the world fights the COVID-19 pandemic, some in the scientific and political communities are divided over whether the virus in question, 2019-nCoV, has naturally mutated or been genetically engineered. At the core of this debate is the enhanced ability of the novel coronavirus' spike protein (S protein) to bind to the angiotensin-converting enzyme 2 (ACE2) receptors on human cells, as compared to other coronaviruses. This debate aside, the pandemic has certainly thrust the limelight on China's irresponsible behaviour and more importantly, biological warfare.

### What is Biological Warfare?

Biological Warfare or bio-warfare, is the use of biological weapons by States to harm or kill the citizens, animals and plants of the target country. Biological weapons are disease-causing agents that belong to any of the following five categories—Bacteria, Fungi, Rickettsiae, Viruses and Toxins. The characteristics that govern the weaponisation of these agents are—lethality, contagiousness, stability, ease of detection and other features like odour, colour and taste. Bio-weapons may be sprayed as an aerosol, disseminated

### Key Points

1. India needs to study the possibility of its agricultural food-chain being attacked using bio-agents and counter the same.
2. Field-deployable sensors for bio-weapons are required, at least along India's sensitive borders.
3. The Armed Forces require a doctrine with respect to bio-warfare.
4. The government and the Armed Forces need to review their vaccine stocks.
5. The citizens of the country need to be co-opted in the fight against national security threats as part of full-spectrum preparedness by means of education and sensitisation.

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## Silent Killers: ...

through explosives, introduced into the water and food supplies, injected or made to be absorbed.

Some of the world's most researched and deadly bio-weapons are Aflatoxins (produced by fungi), *Bacillus anthracis* (which causes Anthrax), Botulinum toxin (obtained from *Clostridium botulinum*), the Bunyaviridae family of viruses (causing Hanta Pulmonary Syndrome, Rift Valley Fever and Crimean-Congo haemorrhagic fever), the Ebola virus (which causes the Ebola Virus Disease), *Francisella tularensis* (which causes Tularemia), the Marburg virus (which causes Marburg Haemorrhagic Fever), *Variola major* (which causes Smallpox) and *Yersinia pestis* (which causes Plague).

In addition to Taiwan, there are 16 countries that have had or suspected of having bio-weapon programmes—Canada, China, Cuba, France, Germany, Iran, Iraq, Israel, Japan, Libya, North Korea, Russia, South Africa, Syria, the UK and the US.<sup>1</sup>

While bio-weapons do not cause physical destruction of infrastructure, the toll on human lives in terms of death, risk of exposure and disruption is massive, making them 'Weapons of Mass Destruction' (WMDs).

The 1972 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, also referred to as Biological Weapons Convention (BWC), addresses the threat of bio-weapons. Currently, there are 182 states/parties and five signatories to it. India has ratified this treaty. Ten States have neither signed nor ratified the BWC, namely, Chad, Comoros, Djibouti, Eritrea, Israel, Kiribati, Micronesia, Namibia, South Sudan and Tuvalu. One major drawback of this treaty is that, it has no provisions to monitor compliance to its framework.<sup>2</sup>

### Bio-Warfare in Ancient/Recent Times

The prosecution of bio-warfare is not a novel concept and can be traced back thousands of years. The ancient Indian treatise on statecraft, economic policy and military strategy—*Arthashastra*—details not only the myriad ways of poisoning the adversary, but also detecting poisons, identifying the poisoner and

creating poisons for specific purposes. The author, Kautilya, mentions how poison could be mixed with liquor and sold at discounted rates, for example.<sup>3</sup> He further explains, how various poisons could be prepared for poisoning particular sources such as grass or water.<sup>4</sup> Additionally, he has also mentioned which poison induces a particular condition, such as blindness or biting madness.<sup>5</sup>

More recently, it has been alleged that, the British (colonial) forces gifted smallpox-infected blankets to Native Indians during the Siege of Fort Pitt in the eighteenth century.<sup>6</sup> During World War I, Germany used anthrax- and glanders-causing bacteria to infect animals in the adversary's forces.<sup>7</sup> During World War II, Imperial Japanese Army's Unit 731 not only injected Chinese captives with bacteria, causing cholera and gonorrhoea, but also introduced typhus- and cholera-causing bacteria into wells used by the Chinese and dropped bombs with plague-infested fleas over Chinese villages and cities.<sup>8</sup> Instances such as the 'yellow rain'<sup>9</sup> have occurred as recently as 1981 and it is strongly believed that many countries maintain a secret bio-weapon programme. In fact, the al-Qaeda was also in pursuit of biological weapons and Ayman al-Zawahiri oversaw an unsuccessful effort to attack the US with Anthrax.<sup>10</sup>

Advances in biotechnology and gene-editing, especially Clustered Regularly Interspaced Short Palindromic Repeats-CRISPR associated protein 9 (CRISPR-Cas9) technology, have made it possible to find cures for hitherto untreatable diseases, create healthier food, etc. However, the same has also made it possible to genetically engineer pathogens to enhance their virulence and create novel bio-weapons—a field referred to as 'Black Biology'. Given the dual nature of this technology, seemingly benign programmes such as US Defense Advanced Research Projects Agency's 'Insect Allies'<sup>11</sup> have evoked suspicion of being bio-weapons programmes.

History is also replete with examples of 'Entomological Warfare', i.e., use of insects and other arthropods against the enemy. The nineteenth-century Emir of Bukhara (modern-day Uzbekistan), Nasrullah

Bahadur-Khan, constructed a 21-foot deep 'Bug Pit' filled with Assassin Bugs and Sheep Ticks which, in some instances, ate the prisoners alive.<sup>12</sup> During the Vietnam War, the Viet Cong hurled wasp and hornet nests into US positions.<sup>13</sup> In the contemporary technology-driven world, insects have served as models for bio-inspired robots, such as r-one (ant-inspired), RoboBees (bee-inspired) and DASH (cockroach-inspired).<sup>14</sup>

### China's Response to 2019-nCoV: Outbreak to Pandemic

China has been accused of prioritising political considerations over medical. The now late Dr Li Wenliang had warned fellow doctors in Wuhan about the disease as early as December 2019. But rather than investigating his concerns, the authorities in China investigated him for 'spreading rumours'. He was asked to stop 'making false comments' and disturbing 'social order'.<sup>15</sup> In fact, a lawyer—Chen Qiushi—who shared videos of coronavirus victims in Wuhan hospitals has been missing for more than 2 months now.<sup>16</sup> Despite medical staff getting affected in China and Taiwan's alert to the World Health Organisation (WHO) about the disease being highly contagious, little was done to address the same and it was not until late January 2020 that both China and WHO confirmed human-to-human transmission of 2019-nCoV.<sup>17</sup> All this while, China was not only scaling back export of personal protective equipment (PPE) and other medical gear, but also importing the same.<sup>18</sup>

This is not the first time China has withheld crucial information, imperiling the lives of people around the world. China was rebuked by WHO in 2002 for concealing vital information vis-à-vis Severe Acute Respiratory Syndrome (SARS)—the first pandemic of the twenty-first century.<sup>19</sup>

China's response to the pandemic, in terms of supplying PPE and test-kits to countries, has not evoked a positive response either. Spain, Turkey and the Netherlands have rejected China-made equipment for combating coronavirus for being defective or sub-standard.<sup>20</sup> Spain, in fact, sent back two batches of China-made coronavirus testing-kits following accuracy concerns.<sup>21</sup>

The Indian Council of Medical Research (ICMR) has asked states not to use Chinese, rapid test-kits following huge variations in the accuracy of results (6-71 per cent).<sup>22</sup>

This underlines the importance of transparency and effective communication while dealing with such threats—the Achilles' heel of authoritarian regimes. Wanton or otherwise, there is little doubt that China's behaviour and opacity of functioning have indeed turned a local outbreak into a pandemic.

### The Indian Scenario

Using insects and pathogens against humans aside, if the same are directed against a country's food-supply chain, it could have serious economic implications. This brings one to the crucial question of how prepared India is for entomological and herbicidal warfare<sup>23</sup> against her crops and livestock. It is pertinent to mention here that export of buffalo meat, cashew, castor oil, cereals, etc., forms a significant portion of India's agricultural exports. Any deliberate or accidental introduction of pathogens targeting these would not only have an immediate, but also a long-term impact on India's exports given that the psychological effect of a disease-outbreak could remain even after the disease is controlled and may result in major importers not buying Indian produce.

Needless to state, the Indian government would evaluate its response mechanism, including Centre-state coordination and resource-management, medical infrastructure and multi-agency cooperation, in the wake of the COVID-19 crisis and institutionalise the lessons learnt. Despite the resource constraints and the economic blow due to the pandemic, India would need to be prepared for such high-intensity, low-probability incidents. In this regard, the following points may be of interest:

- Taking inspiration from this pandemic, there could be some attempt of bio-warfare/bio-terrorism from NSAs or 'State-backed NSAs'. Hence, appropriate 'field-deployable sensors' for bio-weapons need to be installed along at least our sensitive borders (land, water and air).

- The Armed Forces and the government should take stock of their vaccine supplies against bio-weapons.
  - The Armed Forces need to formulate a doctrine to cater to bio-warfare.
  - The government may institute a task force to study the possibility of India's crop and livestock being harmed (either accidentally or deliberately) and design a response mechanism for preventing the same and protecting India's agricultural supply-chain, if not done already.
  - An aware and disciplined citizenry is pivotal to all government initiatives in times of a calamity. Hence, the government should sensitise and educate the citizens on conduct-related aspects during times of (relative) peace. The government may also take a long-time view of this by introducing such aspects in the curriculum of schools and colleges.
  - Weaponisation aside, biological agents can also be used for benign purposes. China's recent offer of deploying 1,00,000 ducks to Pakistan, to help the latter tackle the problem of locust swarms that eat crops is a case in point.<sup>24</sup> This 'ducklomacy' is an environment-friendly option to chemicals such as *Bifenthrin* and could perhaps prove to be cost-effective too. Are there avenues for India to explore diplomacy in this area?
  - Another example is of the use of weapon-grade chillies (*bhut jolokia* chillies) for counter-insurgency and riot control by the Indian Army.
  - The Armed Forces could re-visit ancient texts, such as the *Arthashastra* and analyse, if warfare agents mentioned in those could be employed for defensive use, within the confines of international norms.
- As the targets and tools of warfare increase, India needs to maintain full-spectrum deterrence, with emphasis on a plan for resource allocation and efficient communication.

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