Planning for a biosecure future

(Mains GS 3 : Science and Technology: Recent developments and their applications and effects in everyday life & Internal security: Challenges to internal security (external state and non-state actors)

Context:

- COVID-19 has made it clear that our traditional imagination of national security is no longer credible.
- The growth of exponential technologies such as synthetic biology, artificial intelligence and nanotechnology is bound to change the theory and practice of national security and COVID-19 has quickened the inevitable.

The biological revolution:

- The future of national security studies will be forced to undergo a paradigm shift if it must retain any policy impact.
- Among the exponential technologies shaping the world today, the biological revolution is of exceptional importance.
- The rapid rise of synthetic biology in the last two decades and its still-to-be-understood implications haven't received sufficient attention from the security studies or policy communities.
- COVID-19 has further highlighted the biosecurity concerns of synthetic biology.

Disruptive basic research areas:

- The new organisms, biological parts and devices that can be created or existing natural life forms can be redesigned should be a matter of concern for scientists.
- Today, there is a growing realisation that exponential technologies have hitherto unforeseen national and global security implications.
- For example: In 2014, the U.S. Department of Defense categorised synthetic biology as one of the six 'disruptive basic research areas'.
- Even though linkage between national security and synthetic biology is yet to become an agenda item in mainstream national security debates.

Synthetic biology and associated concerns:

- Synthetic biology is a revolutionary technology which can help us manipulate biological organisms and processes for human betterment, especially in treating diseases, by re-engineering cells.
- However, there are many risks associated with the technology which must be addressed before it becomes widely accessible.
- There is the possibility of deliberate misuse of the technology.
- There is a need to carefully review, especially in the wake of the pandemic, the biosecurity systems in place where such technologies are in use.
- Accidental leaks of experimental pathogens are another concern.
- Insufficiently trained staff, inadequately safeguarded facilities, and lack of proper protocols could all be behind such leaks.

Threats emanating from biological sources:

- There has been very little focus on threats emanating from biological sources, contrast this with the focus on nuclear weapons,
- Nuclear weapons are not only tightly controlled but are also the subject of strong global regimes.
- This is despite the fact that a well-orchestrated biological attack could have serious implications even though it would be less ‘spectacular’ since its effects are less immediate.
- A well-planned attack using highly infectious pathogens synthetically engineered in a lab could be disastrous.
- Unlike the nuclear domain, the fields of biology or synthetic biology are not regulated internationally despite growing military interest in synthetic biology applications and their potential misuse.

Weapon of mass destruction:

- The ‘weapon of mass destruction’ (WMD) capability of bio-weapons has been long recognised but very little has been done by the international community about it.
- Of the three types of WMD, nuclear weapons have received the maximum safety and security attention given the treaty and institutional arrangements associated with it.
- Chemical weapons which come next also have an international convention and an implementing body.
- However, when it comes to bio-weapons, all we have is the Biological and Toxin Weapons Convention (BTWC) of 1972 with no implementing body.
- The BTWC does not have a verification clause, nor does it have clearly laid down rules and procedures to guide research in this field.

Dilemma of Biological and Toxin Weapons Convention (BTWC):

- The dilemma is evident in Article 1 of the BTWC itself which bans “microbial or other biological agents, or toxins, whatever their origin or method of production” that “have no justification for prophylactic, protective or other peaceful purposes”.
- In other words, while bio-weapons are banned, research for medical and bio-defence purposes are allowed.
- The problem is that there is a thin line between bio-defence research and bio-weapons research.
- Since bio-defence research routinely uses pathogens and toxins for experimental purposes, processes, know-how and outcomes of bio-defence research could potentially be used to create bio-weapons.
- More so as the pharmaceutical industry has vehemently opposed any intrusive inspection regime.

India uniquely unprepared:

- India is at a uniquely disadvantaged position compared to the more developed countries in this area.
- India has poor disease surveillance, insufficient coordination among various government departments dealing with biosecurity issues, and the pathetic state of the healthcare system.
- India has multiple institutions dealing with biosafety and biosecurity threats but there is no coordination among them.
- For instance, implementation of biosafety guidelines is the responsibility of the Science and Technology Ministry and the Environment Ministry.
- However, labs dealing with biological research are set up under the Indian Council of Medical Research and the Indian Council of Agricultural Research, which are under the Ministries of Health and Agriculture, respectively.

Concerns for India:

- The multiplicity of bodies and ministers makes coordination difficult for biosafety, especially in the absence of an empowered coordinating body.
- The rising risk of diseases of zoonotic origin is quite evident thus, the traditional ministry-wise separation might not be useful.
- India has porous borders and ill-trained border control institutions which are not prepared for defending against pathogens or dangerous biological organisms or agents arriving from abroad.

Conclusion:

- Pandemics have highlighted that the traditional distinction at the international institutional level between biological weapons (a field governed by the BTWC) and diseases (a domain under the World Health Organization) may not be useful anymore.

- There needs to be more conversation between health specialists and bio-weapons/defence specialists.
- Thus, the November 2021 BTWC review conference must take stock of the advances in the field, address the thinning line between biotechnology research and bio-weapons research, and consider international measures for monitoring and verification.