Chemical, Biological, Radiological and Nuclear (CBRN) reconnaissance vehicles

Mains: *GS III – Security*

Why in News?

The Defence Acquisition Council (DAC) has granted AoN for CBRN reconnaissance vehicles for the Indian Army to enhance detection and assessment of chemical, biological, radiological and nuclear threats.

What are CBRN Reconnaissance Vehicles?

- **CBRN reconnaissance vehicles** – These are specialised military platforms equipped with detection, monitoring and identification systems.
- Their primary role is to detect hazardous agents, assess contamination, mark affected areas and transmit information to operational formations.
- Unlike combat platforms, they are *not primarily designed to attack the source of contamination.*
    - Instead, they provide commanders with the information needed to plan routes, deployment and operations in contaminated environments.
- **CBRN Reconnaissance Vehicle (Tracked) Mk-II –** It is based on the BMP-II infantry combat vehicle platform, that re-engineered to accommodate CBRN reconnaissance equipment.
- **Features**
    - **Terrain –** Designed for operations in plains, desert and semi-desert terrain.
    - **Detection –** Identifies chemical, biological, radiological and nuclear hazards.
    - **Monitoring –** Assesses and monitors contaminated areas.
    - **Marking –** Marks contaminated zones to prevent inadvertent entry.
    - **Communication –** Transmits information to supported formations.
    - **Mobility –** Its tracked platform enables it to accompany military formations during operations.
- The vehicle combines *mobility, protection and specialised detection capability* in a single platform.

Why are CBRN Reconnaissance Vehicles Important?

- **Enhancing Situational Awareness –** CBRN agents may be invisible and difficult to detect through conventional means.
    - Specialised reconnaissance vehicles provide commanders with timely information about the **location, nature and extent of contamination**.

- **Reducing Exposure of Personnel –** Operating in contaminated environments can expose soldiers to potentially lethal agents.
    - Reconnaissance vehicles allow detection and assessment from a protected platform, thereby reducing unnecessary exposure.
- **Supporting Military Mobility –** Contaminated areas can restrict the movement of troops and equipment.
    - By identifying and marking hazardous zones, these vehicles help commanders plan safer routes and avoid accidental entry into contaminated areas.
- **Enabling Subsequent Response –** Reconnaissance is the first step in a broader CBRN response.
    - Information collected by these platforms can support decontamination, protective measures and further hazard assessment.

What are the Existing Challenges in CBRN Defence?

- **Complex Nature of Threats –** Chemical, biological, radiological and nuclear agents differ significantly in their characteristics, detection requirements and effects.
- A comprehensive response requires specialised equipment and trained personnel.
- **Need for Integrated Response –** Reconnaissance vehicles alone cannot address CBRN threats.
    - They must operate alongside protective equipment, decontamination systems, medical support and command-and-control mechanisms.
- **Operational Demands –** Effective CBRN reconnaissance requires reliable sensors, accurate identification, timely communication to operate in difficult environments.
- **Human and Unmanned Coordination –** While unmanned systems reduce exposure to hazards, manned platforms remain important for mobility, command and operational integration.
    - Both need to function as part of a coordinated system.

What could be done?

- **Strengthen indigenous R&D** in CBRN detection, monitoring and protection technologies.
- Promote **integration of manned and unmanned** reconnaissance systems.
- **Improve training and preparedness** of military personnel for CBRN contingencies.
- Develop robust **inter-agency coordination** for CBRN emergencies.
- Ensure that procurement is accompanied by maintenance, technological upgrades and lifecycle support.
- Build a **comprehensive CBRN defence architecture** covering detection, protection, decontamination and medical response.

What lies ahead?

- The acquisition of CBRN reconnaissance vehicles reflects India’s efforts for preparedness against chemical, biological, radiological and nuclear threats.
- The effectiveness of these vehicles depends on their integration into a layered CBRN defence system.

- Combining manned vehicles, unmanned platforms, indigenous technology and trained personnel will be essential for building a resilient defence capability.
- The acquisition of niche military platforms, therefore, is not merely an inventory enhancement but also an opportunity to build indigenous technological capacity.

Reference

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