India’s Drone Ecosystem

Mains: *GS-III – Science & Technology*

Why in News?

Over the past two decades, drone technology has emerged as a transformative tool globally; India is rapidly leveraging its potential across governance and development sectors, that reshaping public service delivery, infrastructure management, agriculture, and national security.

What about India’s Drone Ecosystem & Policy Push?

- **Transition to Mainstream** – India’s drone ecosystem has moved from pilot projects to a mainstream, innovation-driven sector, supported by progressive policies and financial incentives.
- **Expanding ecosystem** – India’s growing drone adoption reflects a well-developed ecosystem of manufacturers, software and component developers, service providers, training institutions, certified pilots, start-ups, research organisations, and digital platforms—all operating under a *unified regulatory framework*.
- **Policy support** – The Government has played a pivotal role in accelerating this transition through progressive policy reforms, simplified regulations, and robust digital governance mechanisms.
- **Inclusive Initiatives** – The Government programmes promote women-led entrepreneurship, rural access, and domestic manufacturing, ensuring broad participation and equitable growth.
- **Multi-Sector Integration** – Drones are now embedded in agriculture, land surveys, infrastructure monitoring, disaster assessment, defence, and public services, enhancing efficiency, transparency, and precision in governance.
- **Key Enablers** – Liberalised Drone Rules, the Digital Sky platform, skill programmes, and manufacturing incentives have
    - Lowered entry barriers
    - Improved compliance
- Enabled drones to be seamlessly integrated into flagship government schemes and everyday public service operations.

How has the Public Service Delivery been transformed through Drone Technologies?

- **Drones in Public Service** – Drones are now central to flagship schemes like SVAMITVA and PMFBY, improving precision, transparency, and efficiency in

governance.

- **Agriculture & Farmer Services – Namo Drone Didi Scheme**
- Launched in 2023, with an aim to provide drones to Women Self Help Groups (SHGs) to support modern farming practices, marks a significant shift from manual and labour-intensive practices to precision agriculture.
- **Impact –** 1,094 drones distributed; SHGs offering spraying service,s enhancing income and social empowerment.
- **Land Mapping – SVAMITVA Scheme**
- Launched in 2020, intended for drone-based mapping for the survey of rural abadi areas to settle land dispute cases and to improve access to bank credit.
- **Impact** – Nearly 3.44 lakh villages are targeted to be covered & completed in 3.28 lakh villages (95% target), 2.76 crore property cards issued across 31 states/UTs.
- **Aerial Mapping for Highway Development** – NHAI mandates monthly drone-video recordings for all highway projects to ensure accurate progress tracking & accountability.
- Drone data stored in the Data Lake serves as a permanent record, usable as evidence in dispute-resolution before arbitral tribunals and courts.
- **Use of Drones in Disaster Management & Emergency Response** – The North East Centre for Technology Application and Reach (NECTAR) has developed, can stay stable in the air for a long time and carry heavy equipment.
- It is used to watch affected areas during floods, landslides, and other disasters.
- It provides live visuals from the sky, which helps rescue teams understand the situation quickly.
- **Railway Drone Monitoring** – Drones used for track, bridge, and infrastructure inspections.
- The Railway Protection Force (RPF) has adopted drones for security surveillance, real-time tracking, aerial monitoring, supporting crowd management and anti-trespass operations.
- **Drones in Defence** – Drones help the armed forces to watch borders, gather intelligence, and carry out precise strikes.
- During Operation SINDOOR, Indian drones and loitering munitions destroyed enemy targets safely and accurately.
- Drones work with air defence systems, radar networks, and command centres to protect infrastructure and respond quickly to threats.

How India has accelerated Drone Adoption via Policy, Programs and Reforms?

- **Drone Rules, 2021 and Drone (Amendment) Rules 2022 & 2023** – It has liberalised India's drone ecosystem.
    - Regulatory procedures were simplified, with forms reduced from 25 to 5 and approval requirements lowered from 72 to just 4.
    - Fees were rationalised and delinked from drone size.
    - Civilian drone operations were permitted for weighing up to 500 kg
    - Nearly 90% of Indian airspace was declared a Green Zone for drone operations, allowing flights up to 400 feet.
    - The Remote Pilot Certificate replaced the traditional licence issued by the DGCA.
    - The passport requirement was removed & any government-issued ID is accepted

- **Impact** – These reforms significantly lowered entry barriers, encouraged rural adoption, and supported Drone-as-a-Service models.
- **Production Linked Incentive (PLI)** – PLI scheme aims to promote high-value domestic manufacturing by encouraging local production & supports start-ups & MSMEs to scale production and strengthen the local ecosystem.
- **GST on drones** – GST on drones was *reduced to 5%* (Sep 2025); earlier tax rates of 18% and 28% were removed.
- The NextGen GST reform applies to flight and motion simulators used for drone pilot training.
- This will lower costs for training institutes and further strengthen skill development in the drone ecosystem.
- **Digital Governance Platforms**
- **Digital Sky (2018) & eGCA** – Unified system for registration, certification, operational services such as flight plan and airspace map continue to be integrated with the Digital Sky Platform.
- **Achievements** (Feb 2026) – 38,575 drones registered (UIN issued), 39,890 Remote Pilot Certificates granted, 244 RPTOs approved nationwide supports strengthening institutional capacity for pilot training and skill development.
- **Ecosystem Development & Capacity Building**
- **Flagship events** - Bharat Drone Shakti, Mahotsav, and International Expo promote Drone-as-a-Service & indigenous tech, which showcase indigenous technologies and encourage collaboration.
- DGCA-approved Training programmes & RPTOs expanding certified pilot pool.
- **SwaYaan Programme** – It is a Capacity Building programme, so far, 857+ activities conducted, benefiting 26,000+ participants, with 337 collaborations.
- National Innovation Challenge for Drone Application and Research **(NIDAR) Innovation Challenge** – Promotes autonomous drones for disaster management and precision agriculture, offers a Rs. 40 lakh prize pool and supports start-up incubation.

What lies ahead?

- Looking ahead, India is expanding domestic drone production and strengthening remote pilot training, linking drones with state and central programmes for socio-economic empowerment, infrastructure oversight, and national security.
- With budget allocations, innovation grants, and strategic deployment, India is building a robust ecosystem that balances commercial growth, technological self-reliance, and inclusive development, positioning itself as a global leader in unmanned aerial systems.

Reference

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