Science & Technology · GS - III

Discuss India’s achievements in the field of Space Science and Technology. How the application of this technology has helped India in its socio-economic development?

EXAM YEAR	PAPER	SUBJECT
2016	GS - III	Science & Technology

MARKS	WORD LIMIT
12.5	~200 words

Answer Hint

ISRO; satellite technology; launch vehicles; Chandrayaan; Mars Orbiter Mission; remote sensing; communication; disaster management

Model Answer

Introduction

India's space programme, led by the Indian Space Research Organisation (ISRO), has developed capabilities in satellite construction, launch vehicles, planetary exploration and practical applications for development.

Major Achievements

- **Launch vehicles:** The Polar Satellite Launch Vehicle (PSLV) established a reliable capability for launching satellites into orbit.
- **Communication satellites:** INSAT and GSAT systems support telecommunications, broadcasting and related services.
- **Remote sensing:** IRS satellites provide information on agriculture, forests, water resources and land use.
- **Planetary exploration:** Chandrayaan-1 advanced lunar research, while the Mars Orbiter Mission successfully entered Mars orbit in 2014.

- **Navigation:** The Indian Regional Navigation Satellite System, later known as NavIC, strengthened regional positioning capabilities.
- **Cost-effective missions:** India demonstrated its ability to undertake complex missions with comparatively economical approaches.

Contribution to Socio-Economic Development

- **Agriculture:** Satellite data supports crop assessment, drought monitoring and land-resource planning.
- **Disaster management:** Remote sensing and satellite communications assist cyclone tracking, flood mapping and emergency coordination.
- **Education and healthcare:** Satellite communications can support distance learning and telemedicine in remote areas.
- **Fisheries and transport:** Satellite-based services assist navigation, communications and location-based information.
- **Governance:** Geospatial information supports infrastructure planning, watershed development and monitoring of public programmes.
- **Weather forecasting:** Meteorological satellites improve observation of clouds, cyclones and atmospheric conditions.

Challenges and Way Forward

India must continue investing in research, advanced manufacturing, space situational awareness and reliable access to satellite services. Applications should be made accessible to underserved communities.

Conclusion

Space science has evolved from a research-oriented programme into an important development tool. Sustained innovation and effective application of satellite data can further improve livelihoods, governance and national resilience.

BECOME IAS
AI POWERED UPSC PREP