



Tamil Nadu
Coastal Restoration Mission



Draft Drone Policy - TN SHORE



Tamil Nadu Sustainably Harnessing Ocean Resources and Blue Economy
Environment, Climate Change and Forest Department

DRAFT DRONE POLICY

TAMIL NADU COASTAL RESTORATION MISSION

Table of Contents

Section	Page No.
1. Introduction	2
2. Policy Objectives	2
3. TN SHORE Relevance	3
4. Existing GoI Regulations	4
5. Classification for UAS Operations – TN SHORE Alignment	5
6. Operational Guidelines relevance to TN SHORE	6
7. Monitoring and Evaluation	10
8. Mandatory Safety Features	11
9. Risk Assessment and Mitigation	12
10. Data Governance & Ethics	13

DRAFT DRONE POLICY

TAMIL NADU COASTAL RESTORATION MISSION

Drone operations in India are currently regulated by guidelines set forth by Government of India, Ministry of Civil Aviation (MoCA). MoCA notified the ‘Drone Rules, 2021’ in Aug 2021 (amended in February 2022) which is applicable to all Drones up to weights of 500 kg that are registered or operated in India. Further, the February 2022 amendment abolished the requirement of a Drone pilot license, thereby allowing a remote pilot certificate issued by a DGCA-authorized Drone school, for operating Drones. Director General of Civil Aviation (DGCA) has also established “Digital Sky” – an online single-window platform for all activities related to the management of Drones, which enables online registration of pilots, devices and service providers. This Document “Draft Drone Policy for Tamil Nadu Coastal Restoration Mission” provides Application of Drone As A Service -DAAS for the Establishment of state-level coastal zone management databases and information management systems (“MISs”)

A step towards making India a global drone hub by 2030

Policy Objectives

- Technical assistance to Project Executing Agencies (“PEAs”) to develop baseline assessments (using drones, wherever appropriate) of coastal ecosystems, measure carbon stocks, monitor the condition of mangroves, coastal wetlands, seagrasses, other coastal habitats, and plastic pollution
- Establishment of state-level coastal zone management databases and information management systems (“MISs”)
- Enhance surveillance of canopy and social monitoring along the 1,076 km coastline

- Ensure safe, legal, and sustainable drone operations in Coastal Regulation Zones (CRZ) in accordance with the Directorate General of Civil Aviation's Drone Rules, 2021 and Drone (Amendment) Rules, 2023
- Promote innovation and public-private partnerships in Drone as a Service - DAAS.
- TN SHORE Department aims to position the Drone Ecosystem R&D. This Policy would also improve Drone usage in alignment with SDG Goals 13-15 (Climate Action, Life Below Water, LIFE On Land) for global alignment.

TN SHORE Relevance

- Ensures controlled drone activity and regulatory oversight near sensitive coastal infrastructure including nature-based infrastructure and airport corridors.
- Supports Environment and Social Framework compliances
- Enables strategic environmental monitoring with Air Traffic Control coordination in semi-restricted areas.
- Enhances coastal zone management and climate resilience planning.
- Supports real-time environmental data collection in green zones.
- Aligns with climate governance and stakeholder transparency goals.
- Strengthens local ecosystems and technology self-reliance in climate governance tools.
- Enhances precision navigation for coastal monitoring, CRZ compliance, and environmental data collection.
- Aligns with TN SHORE's goals of resilience, innovation, and institutional accountability.
- Supporting stakeholder engagement through transparent airspace governance.
- Facilitates real-time coordination for UAS operations in coastal and ecologically sensitive zones.
- Technical assistance to the Forest Departments in establishing regulatory frameworks to access carbon finance and for nature-based investments

Existing GoI Regulations

“GREEN ZONE” – UAS AIRSPACE CLASSIFICATION:

- Geographic Scope: Applies to land areas and territorial waters of India.
- Vertical Limit: Up to 400 feet (120 meters) above ground or water level.
- Exclusion Criteria: Must not be designated as a Red Zone or Yellow Zone in the official airspace map.
- Airport Proximity Clause:
 - Includes airspace between 8 km and 12 km from the perimeter of an operational airport.
 - Within this band, the vertical limit is reduced to 200 feet (60 meters).

“YELLOW ZONE” – UAS AIRSPACE CLASSIFICATION:

- Geographic Scope: Applies to land areas and territorial waters of India.
- Operational Restriction: UAS operations in this zone are restricted and require prior permission from the relevant Air Traffic Control (ATC) authority.
- Vertical Boundaries:
 - Airspace above 400 feet (120 meters) in designated Green Zones is classified as Yellow Zone.
 - Airspace above 200 feet (60 meters) in the band 8 km to 12 km from the perimeter of an operational airport is also designated as Yellow Zone.

“RED ZONE” – UAS AIRSPACE CLASSIFICATION:

- Geographic Scope:
 - Airspace above land areas and territorial waters of India.
 - Airspace above installations or notified port limits beyond territorial waters, as specified by the Central Government.

- Operational Restriction:
 - UAS operations in Red Zones are strictly prohibited, unless "remotely piloted aircraft" meaning an unmanned aircraft that is piloted from a remote pilot station.

Classification for UAS Operations – TN SHORE Alignment

- Platform: Publication to be made on the Digital Sky Platform, ensuring transparency and accessibility.
- Scope: Segregation of Indian airspace for manned and unmanned aircraft systems (UAS) operations.
- Resolution Standard: Airspace mapping to maintain a horizontal resolution of 10 meters or finer, enabling precise geofencing and compliance tracking.

Category of drones:

Category	Weight Range
Nano UAS	≤ 250 grams
Micro UAS	> 250 grams and ≤ 2 kilograms
Small UAS	> 2 kilograms and ≤ 25 kilograms
Medium UAS	> 25 kilograms and ≤ 150 kilograms
Large UAS	> 150 kilograms

Licensing System for Category of Drones:

Category	Licensing system
Nano	No remote pilot license
Micro	For non-commercial purposes, there is no need for a remote pilot license
Small	Remote pilot license mandatory
Medium	
Large	

Regulatory Alignment:

Aspect	Govt of India Guidelines	TN Coastal Adaptation
Drone Classification	Nano to Large UAVs based on weight	All categories of drones approved by Govt of India regulatory bodies would be permitted in CRZ I to IV
Air Space Zones	Green. Yellow and Red Zones	Air traffic controls (ATC) permission is mandatory for red and yellow zones.

Operational Guidelines – Under TN SHORE

Objective:

To ensure responsible, risk-informed, and compliant use of unmanned aircraft systems (UAS) under the TN SHORE.

Provision:

Prior to initiating drone operations under any component of the Project, the Project Executing Agency (PEA), through the Tamil Nadu Special Project Monitoring Unit (SPMU) and the Tamil Nadu Project Executing Authorities (TNPEAs), shall undertake the following actions:

Certification Standards under TN SHORE Framework:

- Issuing Authority:
 - The Central Government, based on recommendations from the Quality Council of India, may notify standards via the Official Gazette.
- Purpose of Standards:
 - To define eligibility and technical criteria for obtaining Certification for unmanned aircraft systems (UAS).

Promotion of Indigenous Capabilities:

- Encourage use of Made-in-India technologies, designs, components, and UAS platforms.
- Support integration of the Indian Regional Navigation Satellite System (IRNSS), specifically Navigation with Indian Constellation (NavIC).

Certification Exemptions – TN SHORE :

Manufacturing & Import Exemption:

- No Type of Certificate Required for:
 - Manufacturing of unmanned aircraft systems (UAS).
 - Importing UAS for approved use cases (e.g., environmental monitoring, coastal mapping).

Operational Exemption for Specific UAS Types :

- Model Remotely Piloted Aircraft Systems – Typically used for training, simulation, or educational purposes.
- Nano Unmanned Aircraft Systems – Lightweight drones ($\leq 250\text{g}$), ideal for low-risk operations such as:
 - Community-level climate awareness campaigns.

- Environmental documentation.
- Micro-level coastal vulnerability mapping.

Permitted Uses under TN SHORE :

- Environmental Monitoring:
 - Coastal erosion, mangrove health, land accretion, Geographic Delineation etc.,
- Marine Biodiversity Surveillance:
 - Mangroves, other coastal resources etc.,
- Restoration Site Mapping:
 - Mangrove replanting and tracking etc.,
- Aerial Surveys:
 - Sensitive marine habitats and shoreline dynamics
- Real-Time Monitoring:
 - Coastal restoration efforts and project interventions
- Habitat Mapping:
 - Endangered or sensitive species (e.g., seagrass beds, coral reefs, etc.,)
- Documentation:
 - Documentation and chronicling of activities carried out under TNSHORE

Restricted Activities:

- Recreational Flying prohibited in CRZ – I Zone & Ecologically Sensitive Areas for non-commercial drone operations such as nano and micro drone category
- Drone operations during critical nesting or spawning seasons in ecologically sensitive areas shall be in consultation with the Management authorities like DFOs/Wildlife Warden, District Collector or the District Official of the Project Executing Agencies
- Drones operations in Bird Migratory season and Nesting season should be done in a manner not to disturb natural ecological processes and to be

carried out under the instruction of the DFOs/Wildlife Warden, District Collector or the District Official of the Project Executing Agencies

- Drone operations in coastal human dominated areas should have community concerns and to be sensitive to the societal frame works and status.

Pre-Deployment Requirements:

- Purpose of operation should align with Permitted Uses under TN SHORE policy
- Drone should be equipped with GPS, return-to-home, and geo-fencing features (as per DGCA norms)
- Digital Sky Registration:
 - All drone operators and remote pilots must be registered on the Digital Sky Platform.
- Pilot Certification Requirement: A valid Remote Pilot Certificate is mandatory for operating drones above Nano category.

Area-Specific Compliance:

Verification must be specific to the intended area of operation, including:

- Coastal zones under TN SHORE, should ensure airspace integrity and World Bank Environmental and Social Framework
- Supporting real-time coordination with regulatory authorities for no operation zone in airport proximity corridors for safe and lawful drone operations

Access to Digital Sky platform:

Institutional Access to Digital Sky Platform – Governance Integration

- Authorized Entities:

- Nodal officers of State Governments and Union Territory Administrations
 - Law Enforcement Agencies
- Access Provision:
 - These entities shall be granted direct access to the Digital Sky Platform.

Operation and Monitoring of drones:

Operational Protocols:

- Drone should be marked with unique identification number (UIN)
- Visual line-of-sight should be maintained throughout operation
- Emergency protocols should be briefed to the team (such as loss of signal, battery failure, etc.)
- Weather conditions should be assessed and logged, prior to flight
- Data capture should be aligned with approved objectives (e.g., erosion mapping, biodiversity monitoring etc.,)
- No payloads or hazardous materials should be attached unless pre-approved by concerned Project Executing Authorities
- All drones operating under the TN-SHORE be mandated for drone insurance coverage to address risk due to accidents, damages or privacy breaches.

Monitoring and Evaluation:

- Flight log should be submitted within 48 hours
- Data should be archived securely and shared with relevant TN SHORE Executing Departments
- Any deviations or incidents should be reported immediately within 24 Hrs.
- Visuals should be tagged with location, timestamp, and purpose for audit trail.
- Compliance record should be updated for future reference and audits

- Quarterly reports will be submitted by the Project Executing Agencies to the SPMU – TNSHORE on the usage of UAV with the following particulars,
 - Purpose of use
 - Duration of usage
 - Output of the assignment
 - Details of any untoward incidences.

Mandatory safety features

Safety, Airspace Ethics & Incident Reporting:

- Safety Mandate:
 - No person shall operate an Unmanned Aircraft System (UAS) in any manner directly or indirectly, that endangers the safety or security of individuals or property.

Right of Way:

- Airspace Ethics:
 - UAS operators must yield right of way to all manned aircraft.
 - Drone operations must remain clear of manned flight paths at all times.

Mandatory Reporting of Accidents:

- Reporting Timeline:
 - Any accident involving a UAS must be reported within 48 hours of occurrence.
- Reporting Channel:
 - The remote pilot must submit the report via the Digital Sky Platform to the Director General.

Future Safety Mandates for UAS – TN SHORE:

Central Government Notification – Safety Feature Specification :

- Authority: Central Government may notify mandatory safety features via Official Gazette.
- Applicability: All unmanned aircraft systems (UAS) owned by individuals or entities.
- Indicative Safety Features:
 - No Permission–No Take-off (NPNT): Hardware/firmware ensuring regulatory clearance before flight.
 - Real-Time Tracking Beacon: Transmits UAS location, altitude, speed, and unique ID—critical for coastal surveillance and climate monitoring.
 - Geo-Fencing Capability: Prevents UAS from entering restricted zones (CRZ-I areas, ecologically sensitive wetlands etc.,).

Risk and Mitigation

- No drones shall be deployed under any component of the Project unless the Project Executing Agency (PEA), through the TNSPMU and TNPEAs, has fully implemented the prescribed risk mitigation measures
- Notify the Authority of the proposed drone deployment, including scope and intended operational zones.
- Conduct a comprehensive risk assessment, covering:
 - Operational risks
 - Legal and regulatory compliance
 - Institutional and technical feasibility
 - Social and Environmental implications
 - Fiduciary and governance risks
- Recommend appropriate mitigation measures to address identified risks.

Data Governance & Ethics

- Data governance:
 - All data collected through drone operations under the TN SHORE initiative shall be owned by TN SHORE, and its usage, storage, and dissemination shall be governed by the project's data security and access protocols.
- Geo-Tagging Requirement:
 - All environmental and spatial data collected via drones must be geo-tagged for traceability and planning accuracy.
- Privacy Protocols:
 - Enforce strict privacy safeguards for civilian areas to prevent unauthorized surveillance or data misuse.
- Data Sharing Mandate:
 - Environmental datasets to be shared with:
 - SPMU - TNSHORE
 - Project Executing Agencies
 - Purpose: Coastal planning, restoration tracking, and climate resilience mapping etc.,
- Data Storage Standards:
 - Hybrid Storage Model: Combine cloud-based storage with on-site servers for speed and resilience.
 - Automatic Backups: Schedule daily or weekly backups to prevent data loss.
 - Audit Trails: Maintain logs of data access and modifications for accountability.

- Data Format & Interoperability:
 - Standardized Formats: Use open formats like GeoTIFF, LAS (LiDAR), and CSV for metadata.
 - Metadata Tagging: Include timestamps, location, drone ID, and operator details for traceability.
- Operational Efficiency:
 - Compression & Archiving: Use lossless compression for large files (3D models, thermal imagery).
 - Version Control: Maintain version history for datasets used in analysis or reporting.

**Risk Assessment and Mitigation Plan for TN
SHORE Drone Policy - aligned with the World
Bank's ESCP ESS 1.5 requirements, DGCA Drone
Rules, and TN SHORE's Drone Policy.**

Risk Category	Potential Risks	Mitigation Measures
Operational Risks	- Drone malfunction, signal loss, battery failure - Weather-related accidents	- Mandatory pre-flight checks - Emergency protocols briefed - Insurance coverage - Redundant communication systems
Legal & Regulatory	- Unauthorized operations in CRZ or near airports - Non-compliance with DGCA rules	- Digital Sky registration & geo-fencing - Remote Pilot Certificate mandatory - ATC coordination in Yellow Zones - Public notification of restricted areas
Institutional & Technical	- Lack of certification standards - Dependence on imported technology - Limited operator training	- Adoption of QCI-certified standards - Promotion of Made-in-India drones & NavIC integration - Training programs for PEAs - Centralized monitoring cell under SPMU
Social & Environmental	- Disturbance to wildlife during nesting/migration - Community resistance in coastal villages	- Seasonal restrictions in sensitive zones - Consultation with DFOs/Wildlife Wardens - Community engagement sessions - Use of Nano/Micro drones for low-impact documentation
Fiduciary & Governance	- Misuse of drone data - Privacy breaches - Lack of accountability in data use	- Data ownership vested with TN SHORE - Geo-tagging & metadata tagging - Hybrid storage (cloud + on-site) with backups - Audit trails & quarterly compliance reports

Safety Risks	- Collision with manned aircraft - Civilian accidents during operations	- NPNT compliance - Real-time tracking beacons - Geo-fencing for restricted zones - Mandatory accident reporting within 48 hours
Monitoring & Evaluation	- Inadequate reporting - Lack of transparency in drone usage	- Flight logs submitted within 48 hours - Incident reporting within 24 hours - Quarterly UAV usage reports - Independent audits of operations & data governance
