

Forest Stack Open Innovation Challenge 2025

What is the Forest Stack Innovation Challenge?

Forest Stack Innovation Challenge is an initiative by Rajasthan Forest Department in collaboration with Japan International Cooperation Agency (JICA) and Boston Consulting Group (BCG), and hosted by iSTART to unlock innovation in the forestry and climate change space by making relevant data and models available to a wide variety of stakeholders through a data exchange.



Through an Open Innovation Challenge, we aim to identify new ideas, develop impactful solutions, and address real-world Forestry and Climate Change issues.



This is your chance to co-create cutting-edge solutions using real-world forest datasets, powered by our Forest Data Exchange platform.



Whether you're passionate about conservation, driven by data, or driven to support climate resilience—this challenge is designed for you.

About the Forest Stack Data Exchange

The **Forest Stack Data Exchange** is an open-source stack designed to support the development of digital solutions for sustainable forest management. It offers structured access to a wide range of forest and environment related datasets, along with reusable code and modules to facilitate data-driven innovation.

Key Features:



Curated Multi-Source Datasets

The Forest Stack Data Exchange aggregates datasets from forest departments, satellite-based sources, and publicly available environmental and geospatial data. These datasets have been organized to enable easier exploration and analysis.



Reusable Code Assets

The Forest Stack Data Exchange will have open-source scripts and models that support data integration, transformation, and visualization. These assets are intended to accelerate the prototyping process and promote consistent, high-quality outputs.



Open and Collaborative Framework

Built on open-source principles, the Forest Stack Data Exchange allows for modification, extension, and reuse of all shared assets. Participants are encouraged to contribute enhancements and new modules to the broader ecosystem.

A detailed description of the available datasets and technical resources are provided in the **Appendix**

Ecosystem Partners:

Challenge Themes

Participants are invited to propose ideas under one or more of the challenge themes outlined below. The themes represent key focus areas in forest governance, climate resilience, and digital transformation. Solutions may address a specific theme or operate at the intersection of multiple themes.

Each theme is accompanied by illustrative use cases, which are optional starting points to inspire participants. Applicants are free to propose original ideas within the thematic scope or adapt the sample use cases as needed.



1 **Climate Resilience & Disaster Prediction** *Innovate to harness data for anticipating risks and building climate resilience*

- Predicting impact of calamities
- Sand dune stabilization prediction
- Predicting forest fires

2 **Smart Forestry Management** *Develop solutions to enable smarter, timely forest monitoring and protection*

- Invasive species detection
- Predicting deforestation or encroachment risk
- Community led conservation

3 **Advanced Carbon Intelligence Solutions** *Create transparent, data-driven tools for efficient carbon tracking, trading, and reporting*

- Real-time carbon stock potential estimation
- Carbon MRV using drone imagery

4 **Ease of doing businesses** *Develop digital solutions to transform systems and processes enabling ease of business*

- Site Suitability for NoC issuance
- Planning for new developments
- User-friendly application for offences tracking

5 **Sustainable Forest Resource Management** *Innovate to enable responsible, tech-enabled forest resource management*

- Accessibility optimization for forest produce
- Solutions for supply chain transparency
- Digital marketplace for forest produce

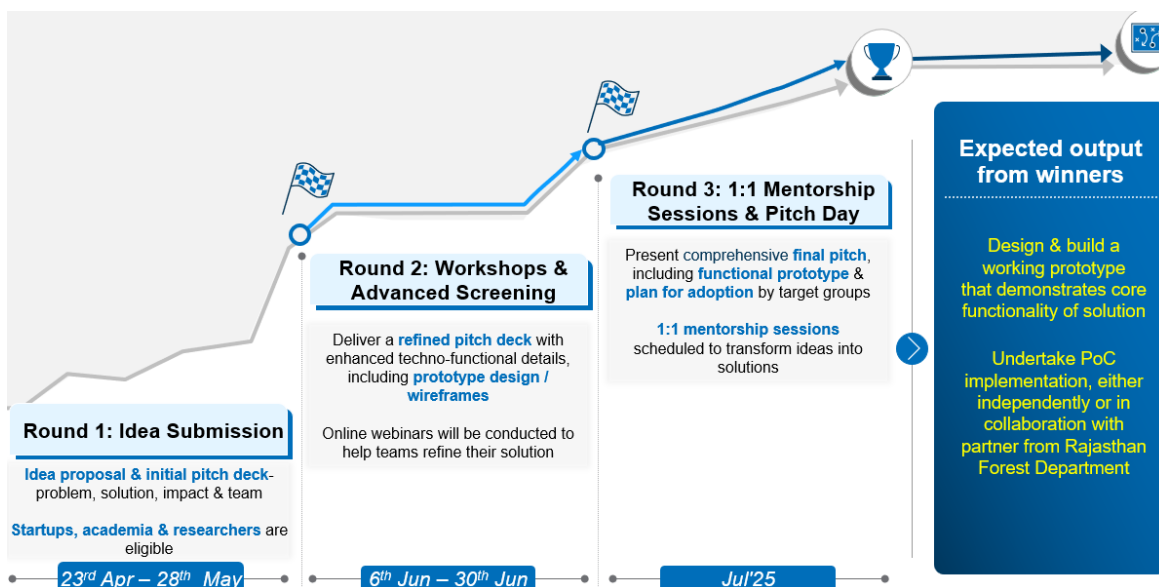
6 **Eco-Tourism & Sustainable Economy** *Design solutions to support local economies and livelihoods*

- Knowledge Hub for Forest-Based Economies
- Safari Booking Demand Estimation
- Animal Spotting Insights

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Structure of the Challenge & Timelines

The challenge unfolds across three stages:



Phase 1

Submissions should include

- Broad idea submission which should include
- Intended users
 - Broad features
 - Potential key impacts
 - Datasets required (existing or additional)
 - Hardware requirement for additional data collection

Mode of submission – Word or PPT document, limited to a maximum of three pages

Selection criteria – Top 20 participants will be shortlisted for Round 2 basis -

- Relevance and impact of idea
- Uniqueness of idea
- Practicality of solution
- Maturity of submission

Phase 2

Submissions should include

- Detailing of core features
- Basic wireframes or solution architecture
- User flow diagrams
- Implementation roadmap & timelines
- Usage datasets specified in Round 1
- Proprietary API, models, data used

Mode of submission – Detailed PPT including all points above

Selection criteria – Top 10 finalists will be shortlisted for mentoring & final pitch round basis -

- Contextualization of concept
- Solution detailing and maturity (core features, wireframes/solution. architecture)
- Impact potential
- Implementation feasibility

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Submissions should include

- Front-end : Detailed screen mockups, Interactive wireframes
- Back end: Use of datasets, AI/data analytics models to be built; system specs needed
- Details of MVP
- Business model and value estimation

Mode of submission – Detailed PPT including all points along with supporting attachments

Selection criteria –Top 3 to 5 winners will be selected basis -

- Solution detailing and maturity (Detailed mock-ups, data models etc.)
- Solution feasibility (technical and practical viability)
- PoC Readiness
- Quality of business presentation/ interaction with panel

Other guidelines

Participants may register as individuals or in teams. Submissions must be original and align with principles of open innovation

Kindly note that submissions should be original ideas, hence, refrain from submitting solutions that are already being used by the Rajasthan Forest Department. You may visit <https://aaranyak.forest.rajasthan.gov.in/> to explore applications with the forest department.

However, incremental features & innovative tech to enhance existing applications are welcome.

Winning teams have the opportunity to build on Forest Stack Data Exchange, as part of the final Proof-of-Concept development with Rajasthan Forest Department

Let's Build the Future of Forestry

The Forest Stack Innovation Challenge is more than a competition—it's a movement. A step toward a smarter, greener, and data-driven approach to forest management and environmental resilience.
Are you ready to turn data into impact? Apply now and lead the change

APPENDIX

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Below is a brief description of the available datasets that can be incorporated into the solutions. The list is non-exhaustive, and participants may propose to utilize other datasets per their idea/solution, which may be provided subject to availability.

NoC Issuance Data

Description: Status and Details of Land NoC Applications within the Rajasthan Forest Department

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
district	String	District where the NoC was applied
circle	String	Circle where the NoC was applied
division	String	Division where the NoC was applied
request_no	ID	Unique identifier for NoC application
process_status	String	Status of NoC (Approved, Rejected, Under Review etc.)
land_shapefile	KML	KML file of proposed land
proposed_area	Float	Area in hectares
distance_water_source	Float	Distance from nearest water source in kms
distance_forest_boundary	Float	Distance from forest boundary in kms
distance_protected_area	Float	Distance from wildlife sanctuary/NP/ES Zone in kms
number_trees	Float	Number of trees in proposed area
forest_density	Float	Forest area in proposed land in hectares
species_details	Array of Map	Count of each species in proposed land

Offences Data

Ecosystem Partners:

Description: Details of offences reported in the Rajasthan Forest

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
range	String	Range where the offense was reported
circle	String	Circle where the offence was reported
division	String	Division where the offence was reported
offence_type	String	Type of offence (eg. Wood Cutting, Hunting, Pruning etc.)
fir_date	Date	Date when FIR was filed
items_seized	Array	Name and quantity of items seized
compounded_amount	Float	Amount collected as compensation
rule_applied	Float	Type of rule enforced (WPA 1972/ FA 1953)

Block Master Data

Description: Database of forest blocks in Rajasthan and their classification

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
range	String	Range where block is located
circle	String	Circle where block is located
division	String	Division where block is located
block_name	String	Name of the block
legal_status	String	Category of block (Eg.: Protected, Reserved, Unclassified etc)
notify_area	Float	Area of block in hectares

Forest Fire Alert Data

Ecosystem Partners:

Description: Status and details of forest fires reported to Rajasthan Forest Department

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
range	String	Range where forest fire was reported
circle	String	Circle where forest fire was reported
division	String	Division where forest fire was reported
district	String	District where forest fire was reported
lat_long	String	Latitude/Longitude of fire incident
date_time	Date-Time	Date and time when fire was reported
status	String	Status of forest fire (Action Initiated, Pending, Closed)
manpower_req	Int	Total number of people required to curtail fire
organization_req	String	Organization required to curtail fire
affected_forest_area	Float	Area of forest that is affected by fire in hectares
wildlife_loss	Array of Map	Species wise loss incurred due to fire

Nursery Data

Description: Details of stock and purchases at nurseries of Rajasthan Forest Department

Ecosystem Partners:

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
circle	String	Circle where nursery is located
division	String	Division where nursery is located
nursery_name	String	Name of the nursery
plant_name	String	Name of the plant
plant_age	Int	Age of the plant in years
plant_height	String	Height range of plant
plant_price	Float	Price of plant per unit
total_stock	Float	Total quantity of the plant in nursery
online_purchase	Float	Total quantity of online purchases at nursery

Mater Produce Data

Description: List of all available forest produce with Rajasthan Forest Department

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
produce_type	String	Broad category of forest produce
base_produce_type	String	Sub-category of forest produce
price	Float	Price of the produce in INR

Produce Auction Data

Description: Details on auctions conducted by Rajasthan Forest Department

Ecosystem Partners:

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
circle	String	Circle where auction was conducted
division	String	Division where auction was conducted
range	String	Range where auction was conducted
depot	String	Depot where auction was conducted
lot_no	ID	Unique ID for forest produce being auctioned
product_type	String	Product type being auctioned
product_unit	String	Unit of measure for forest produce
product_quantity	Float	Total quantity of product being auctioned
bidding_amount	Float	Amount bid for the forest produce in INR

Ecosystem Partners:

Project Shapefiles Data (Anonymized)

Description: Details on afforestation projects undertaken by Rajasthan Forest Department

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
circle	String	Circle where project is present
division	String	Division where project is present
range	String	Range where project is present
block	String	Block where project is present
lat_long	String	Latitude. Longitude of project
project_shapefile	KML	Shapefile of the project

Plantation Site Data (Anonymized)

Description: Details on plantations sites of Rajasthan Forest Department

Ecosystem Partners:

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
site_shapefile	KML	Shapefile of plantation site
circle	String	Circle where plantation site is present
division	String	Division where plantation site is present
range	String	Range where plantation site is present
village	String	Village where plantation site is present
scheme	String	Scheme under which plantation was undertaken (eg. CAMPA, FDA etc)
plantation_year	Date	Year when plantation was undertaken

Project Monthly Progress Report (Anonymized)

Description: Project progress reports of Rajasthan Forest Department

Source: Govt. of Rajasthan

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
circle	String	Circle where project is present
division	String	Division where project is present
range	String	Range where project site is present
site	String	Plantation site name
scheme	String	Scheme under which plantation was undertaken (eg. CAMPA, FDA etc)
physical_target	Float	Target forest area to be covered under project in hectares

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physical_achieved	Float	Achieved forest area cover under project in hectares
budget_utilization	Float	Ratio of budget utilized to allocated for projects at division level
man_days_generated	Float	Number of man-days generated via the project

Administrative Boundaries

Description: Forest and Revenue Boundaries of Rajasthan

Source: Govt. of Rajasthan

File Type: GeoJSON

Species and Carbon Sequestration Data

Description: Details on species and data points required to calculate Carbon Sequestration

Source: Open Source/Govt. of Rajasthan

File Type: CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
name	String	Name of the Species
scientific_name	String	Scientific Name of the Species
volume_equation_type	String	Type of equation used to estimate tree volume
volume_equation_coefficients	String	Coefficients used in the volume equation
wood_density	String	Air-dry wood density in g/cm ³
biomass_expansion_factor	Float	Factor to convert stem biomass to total above-ground biomass.
carbon_fraction	Float	Fraction of biomass that is carbon
co2_conversion_factor	Float	Factor to convert carbon to CO ₂
diameter_growth	Float	Mapping of tree age (years) to estimated diameter (cm)
root_shoot_ratio	Float	Ratio of below-ground to above-ground biomass
stem_leaf_biomass_factor	Float	Factor for estimating stem-to-leaf biomass ratio

Ecosystem Partners:

Satellite Imagery Data

Description: Satellite imagery data
Source: Sentinel-2, European Space Agency (ESA)
File Type: GeoTIFF
Data Description:

- **Availability:** 2017 onwards
- **Spatial Resolution:** 10m

Rainfall Data

Description: Depth of rainfall (in mm)
Source: India Meteorological Department (IMD)
File Type: NetCDF
Data Description:

- **Availability:** 2013 onwards
- **Spatial Resolution:** 0.25 * 0.25 degrees

Soil Moisture Data

Description: Water content in the uppermost layer of soil, typically within the top 0–5 cm
Source: NASA, SMAP
File Type: GeoTIFF
Data Description:

- **Availability:** 2013 onwards
- **Spatial Resolution:** 27.5km

Ground Water Depth

Description: Depth at which soil and rock formations are fully saturated with water, typically measured from the surface to the water table in meters below ground level
Source: Ministry of Jal Sakti (OGD)
File Type: CSV file
Data Description:

Field Name	Type	Description
lat	Float	Latitude of the location
long	Float	Longitude of the location
year	Int	Year when measured
pre_monsoon	Float	Ground water depth pre-monsoon

Ecosystem Partners:

post_monsoon	Float	Ground water depth post-monsoon
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Livestock Data

Description: District-wise details of livestock population

Source: Ministry of Animal Husbandry (OGD)

File Type: CSV file

Data Description:

Field Name	Type	Description
district	Float	District name
livestock_type	String	Category of livestock (eg: Cattle, Buffalo etc)
livestock_count	Int	Total count of livestock

Digital Elevation Data

Description: Avg. distance above sea level

Source: SRTM/ASTER

File Type: GeoTIFF

Data Description:

- **Availability:** Static data collected in 2000
- **Spatial Resolution:** 30m

Temperature Data

Description: Long term average temperature

Source: India Meteorological Department (IMD)

File Type: NetCDF

Data Description:

- **Availability:** 2000 onwards
- **Spatial Resolution:** 1*1 degree

Human Settlement Data

Description: Spatial dataset showing the extent of human settlements across India, derived from high-resolution satellite imagery

Source: NRSC

File Type: GeoTIFF

Data Description:

- **Availability:** 2011 onwards
- **Spatial Resolution:** 30m

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Grassland & Water Bodies Data

Description: Spatial layer identifying **grassland ecosystems, seasonal & perennial water bodies** across India, categorized based on vegetation cover, land use, and phenology

Source: LULC, NRSC

File Type: GeoTIFF

Data Description:

- **Availability:** 2005 onwards
- **Spatial Resolution:** 30m

Forest Fire Data

Description: Location of forest fires reported in India

Source: FSI

File Type: Text files in CSV (Comma-Separated Values) format

Data Description:

Field Name	Type	Description
state	String	state where forest fire was reported
circle	String	Circle where forest fire was reported
district	String	District where forest fire was reported
lat_long	String	Latitude/Longitude of fire incident
date_time	Date-Time	Date and time when fire was reported
forest_block	String	Forest block name

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