

Sundarban Month-by-Month Hazard Calendar

Indian Sundarban Delta (West Bengal) • Quick operational view of wind, rain, lightning, surge/rough sea, salinity intrusion, and fieldwork suitability

Month	Wind	Rain	Lightning	Surge & rough sea	Salinity intrusion	Fieldwork suitability
Jan	L	L	L	L	H	E
Feb	L	L	L	L	H	E
Mar	M	M	H	M	H	G
Apr	H	M	H	M	H	F
May	H	H	VH	VH	H	P
Jun	M	H	H	M	M	F
Jul	M	VH	H	M	M	P
Aug	M	VH	H	M	M	P
Sep	M	H	H	M	M	F
Oct	H	M	M	VH	H	F
Nov	H	L	M	VH	H	G
Dec	L	L	L	L	H	E

Legend (hazards)	Fieldwork	Spring-tide rule
L = Low M = Medium H = High VH = Very High	E = Excellent G = Good F = Fair P = Poor	In May and Oct–Nov, treat ± 3 days around new/full moon as extra-high water-level sensitivity (high tide + surge compounding).

What to do (quick)
Dec–Feb (stable): Surveys, training camps, embankment inspection/repairs; plan stockpiles and boat servicing.
Mar–May (storms + pre-monsoon cyclone): Lightning safety, communications tests, shelter readiness; protect aquaculture and keep emergency water-exchange plan.
Jun–Sep (monsoon): Monitor seepage/slips, erosion hotspots, waterlogging; health/WASH readiness; avoid heavy works on saturated embankments.
Oct–Nov (cyclone peak): Treat as surge months: pre-position boats & relief, run evacuation drills, lock in embankment watch on spring tides.

Basis: IMD 1991–2020 station normals (Diamond Harbour 42811, Digha 42901) + IMD/RSMC cyclone seasonality + multi-meter tidal ranges in the Hooghly–Sundarban estuarine system.

Planning Annex: Sundarban Monthly Hazard Calendar

Indian Sundarban Delta (West Bengal) • Sector checklists tied to the month-wise pattern and spring-tide rule

How to use this annex

Use the month-wise calendar as a trigger for preparedness actions. The annex is organized by sector so the same month can activate different actions (embankments, fisheries/aquaculture, schools/health, mangrove restoration, evacuation/boats).

Spring-tide rule (non-negotiable): In May and Oct–Nov, treat ± 3 days around new/full moon as extra-high water-level sensitivity (astronomical high tide + potential surge + wave setup). Schedule inspections, patrols, and standby capacity accordingly.

Season window	Typical dominant hazards	Operational posture
Dec–Feb	Fog/haze (some days), high salinity, generally calm	Do repairs, surveys, training; stockpile materials; service boats & radios
Mar–May	Thunderstorms + lightning; pre-monsoon cyclone risk (May); high salinity	Lightning protocol + cyclone readiness drills; protect aquaculture; pre-position quick repair kits
Jun–Sep	Monsoon rainfall, waterlogging, erosion; lightning	Monitor embankments daily; prioritize health/WASH; avoid heavy works on saturated slopes
Oct–Nov	Cyclone peak; surge/rough sea; embankment overtopping/breaches	High alert; boats on standby; evacuation drills; spring-tide patrols; rapid assessment plans

1) Embankments and drainage: checklist by season

Goal: prevent small weaknesses from becoming breach cascades during high water (monsoon saturation and cyclone surge). Keep logs with date, tide phase (spring/neap), and location.

A. Dec–Feb (maintenance window)

- Walk the full embankment crest and both slopes; mark low spots, cracks, animal burrows, and seepage points.
- Repair minor erosion, toe scours, and crest ruts; restore turfing/vegetation cover where appropriate.
- Clear silt and blockages from sluice gates and drainage channels; test gate operation.
- Update inventory: sandbags/geo-bags, bamboo poles, tarpaulins, ropes, hand tools; confirm storage locations.
- Map known weak reaches and designate community watch teams for May and Oct–Nov.

B. Mar–May (storm season + readiness)

- Before each thunderstorm cluster, inspect crest for fresh cracks/settlement; patch quickly.
- Confirm rapid-response teams and first-hour breach protocol (who calls, who supplies, who leads).
- Pre-position geo-bags and sandbags at weak reaches; ensure night lighting/torches available.
- If cyclone watch is issued: raise embankment patrol frequency and place teams at spring-tide windows.
- Coordinate with fisheries/aquaculture groups so pond-water releases do not overload drains during heavy rain.

C. Jun–Sep (monsoon monitoring)

- Daily watch for seepage, piping, slope slumps, and toe erosion; photograph and log changes.
- Avoid heavy cutting/vehicle movement on saturated crest and slopes; use light manual methods.
- Keep drains and canals clear; remove water hyacinth and debris to reduce backwater flooding.
- After extreme rain spells, check embankment back-slope saturation and signs of internal erosion.
- Coordinate health/WASH actions where waterlogging persists (vector and waterborne disease risk).

D. Oct–Nov (cyclone & surge posture)

- Activate surge posture on cyclone watch: round-the-clock patrols at vulnerable reaches.
- Prioritize spring-tide windows: add patrols ± 3 days around new/full moon.
- Stage breach-fighting kits (geo-bags, bamboo, rope, cutting tools) within 15–30 minutes of weak points.
- Pre-identify safe dumping zones for emergency materials (avoid blocking drains and evacuation routes).
- After the event: rapid breach assessment within 6–12 hours + plan controlled drainage to prevent long-duration waterlogging.

2) Fisheries and aquaculture: monthly-risk checklist

Goal: protect lives and reduce stock loss from salinity shocks, poor water quality, and cyclone-driven overtopping.

A. Pre-monsoon (Mar–May): heat + lightning + cyclone window

- Lightning rules: stop open-water work when thunder is heard; pre-identify safe shelters.
- Keep cyclone-time pond plan: lower water level if safe, secure nets/screens, protect inlets/outlets.
- Monitor salinity and dissolved oxygen during heatwaves; plan emergency aeration or water exchange.
- Avoid risky night fishing during stormy periods; ensure communication equipment works.

B. Monsoon (Jun–Sep): water quality + disease + access constraints

- Maintain pond bund integrity; check for overtopping pathways and crab holes.
- Monitor turbidity and sudden freshwater influx; adjust feeding to avoid water quality crashes.
- Improve biosecurity: control entry points; dispose mortalities safely; avoid sharing contaminated gear.
- Plan safe harvesting windows between rain spells; maintain boat safety gear.

3) Schools and health (community safety): seasonal checklist

Goal: reduce mortality from lightning, drowning, waterborne disease, and cyclone impacts; keep shelters functional.

A. Lightning and heat (Mar–Sep, highest Apr–May)

- Lightning awareness in schools: ‘When thunder roars, go indoors’ drills; no open-field activities during build-up clouds.
- Identify safe buildings (reinforced roof, wiring checks) and avoid trees/metal poles during storms.
- Heat protection: drinking water availability, shaded rest points for field workers and students.

B. Monsoon health (Jun–Sep)

- Water safety: chlorination plan, safe storage, and rapid response for diarrhea outbreaks.
- Vector control where waterlogging persists: larval source reduction and targeted awareness.
- Keep emergency medicine and ORS stocks; ensure boat/ambulance referral route mapping.

4) Mangrove restoration and shoreline work: what to do when

Goal: match restoration actions to tide/rain seasonality so plantings survive and shorelines stabilize.

A. Best windows (Dec–Feb)

- Site selection and mapping: identify accreting mudflats, creek edges, and erosion hotspots.
- Nursery work: prepare seedlings/propagules, fencing, and community stewardship agreements.
- Small bioengineering (where appropriate): brushwood barriers, sediment trapping structures, signage.

B. Caution windows (Mar–May; Oct–Nov)

- Avoid large new plantings right before cyclone peaks; prioritize protection/maintenance of existing sites.
- Strengthen fencing and markers; check for wave and boat-wake damage points.
- After storm events: assess seedling loss and re-stabilize substrate before replanting.

5) Evacuation, boats, and last-mile response: readiness checklist

Goal: evacuate early under cyclone warning, with special attention to spring-tide windows and night-time high water.

A. Year-round readiness (do in Dec–Feb; verify monthly)

- Update village evacuation map: shelters, raised roads, boat landings, safe routes and alternatives.
- Boat readiness: fuel, life jackets, torches, ropes, anchor, first-aid kit, spare battery/radio.
- Shelter readiness: water, sanitation, separate spaces for women/children, backup lighting, basic medicines.

B. On cyclone watch (especially May and Oct–Nov)

- Activate spring-tide protocol: patrol and standby crews ± 3 days around new/full moon.
- Announce clear decision points: when evacuation starts, who confirms, where boats assemble.
- Pre-position boats on safer leeward landings; avoid exposing boats to open fetch if possible.
- Protect documents and essentials (IDs, medicines, cash) in waterproof bags; prioritize vulnerable groups.
- After landfall: rapid needs assessment; restore communication; coordinate controlled drainage if flooded.

Basis (for reference): IMD 1991–2020 station normals (Diamond Harbour 42811, Digha 42901) and IMD/RSMC Bay of Bengal cyclone seasonality; tides are multi-meter in the Hooghly–Sundarban estuarine system and can amplify inland.