

“**Sundarban month-by-month hazard calendar**” for the Indian Sundarban (West Bengal). It’s built around: (i) IMD 1991–2020 monthly normals for nearby coastal proxy stations (Diamond Harbour + Digha), (ii) IMD/RSMC cyclone-season climatology, and (iii) published tidal-range/tidal-amplification evidence for the Hooghly–Sundarban estuarine system.

### How to read this calendar

**Ratings:** Low / Medium / High / Very High

### Columns:

- **Wind** = squalls/gales likelihood (incl. thunderstorms + cyclonic influence)
  - **Rain** = monthly rainfall + multi-day wet spells
  - **Lightning** = thunderstorm days risk (esp. pre-monsoon + monsoon)
  - **Surge & Rough Sea** = cyclone + high-tide compounding (highest Oct–Nov, also May)
  - **Salinity Intrusion** = risk of saline water pushing inland / higher estuarine salinity (worst late dry season, improves in monsoon)
  - **Fieldwork suitability** = for surveys/restoration works/training camps (practical window)
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### Sundarban hazard calendar (month-by-month)

**Key Sundarban rule:** *Water level risk = Tide + Surge + River stage.*

Tides in the Hooghly–Sundarban system can be **multi-meter**, with tidal range amplifying inland in the Hooghly estuary (reported ~5 m near mouth to ~5.6 m upstream near Hooghly Point).

So, “moderate” surge timed on **spring high tide** can become a major inundation trigger.

#### January

- **Wind:** Low
- **Rain:** Low (dry season baseline)
- **Lightning:** Low
- **Surge & Rough Sea:** Low
- **Salinity intrusion:** Medium–High (dry-season salinity tends to be elevated)
- **Fieldwork suitability:** **High** (best for biodiversity surveys, mangrove assessment, community meetings)
- **Operational notes:** Fog/haze can be significant around estuaries—plan boat navigation timing (morning visibility issues).

#### February

- **Wind:** Low
- **Rain:** Low
- **Lightning:** Low–Medium (starting to rise)
- **Surge & Rough Sea:** Low
- **Salinity intrusion:** High
- **Fieldwork suitability:** **High**
- **Operational notes:** Good month for **embankment inspection** and small repairs (dry ground, easier logistics).

#### March

- **Wind:** Medium (gust fronts begin)
- **Rain:** Low–Medium (convective showers begin)
- **Lightning: Medium–High** (thunderstorm season begins)
- **Surge & Rough Sea:** Low–Medium
- **Salinity intrusion:** High (often near peak)
- **Fieldwork suitability: Medium–High** (workable, but plan around storms)
- **Operational notes:** Start **lightning protocols** for field teams + fishers (safe shelters, no open-water work during build-up).

## April

- **Wind:** Medium–High (Nor'wester squalls)
- **Rain:** Medium (short intense events)
- **Lightning: High** (peak thunderstorm risk ramp-up)
- **Surge & Rough Sea:** Medium (pre-monsoon cyclone window begins)
- **Salinity intrusion:** High
- **Fieldwork suitability: Medium**
- **Operational notes:** For restoration: avoid planting right before peak storm bursts; prefer site prep + fencing/guarding work.

## May

- **Wind:** High (squalls + cyclone window)
- **Rain:** Medium–High (pre-monsoon showers, some years extreme)
- **Lightning: Very High** (one of the worst lightning months)
- **Surge & Rough Sea: High–Very High** (pre-monsoon cyclone risk; surge + tide compounding)
- **Salinity intrusion:** High (until monsoon freshening sets in)
- **Fieldwork suitability: Low–Medium**
- **Operational notes:**
  - Disaster readiness month: test radios, safe routes, boat protocols.
  - Aquaculture: watch salinity stress + disease; maintain safe water exchange windows (don't exchange during storm warnings).

## June

- **Wind:** Medium (monsoon onset winds + squalls)
- **Rain: High** (monsoon starts; wet spells)
- **Lightning:** High
- **Surge & Rough Sea:** Medium (cyclone probability lower than May/Oct–Nov, but not zero)
- **Salinity intrusion: Medium decreasing** (freshwater pulses begin)
- **Fieldwork suitability: Low–Medium**
- **Operational notes:** Start of **waterlogging season**; embankment toes and slopes soften—monitor seepage and small slips.

## July

- **Wind:** Medium
- **Rain: Very High** (wettest core)

- **Lightning:** High
- **Surge & Rough Sea:** Medium
- **Salinity intrusion:** Low–Medium (freshening strongest)
- **Fieldwork suitability:** **Low**
- **Operational notes:**
  - Prioritize **monitoring** over construction.
  - Health risk rises (waterborne disease) — integrate WASH messaging in community programs.

## August

- **Wind:** Medium
- **Rain:** **Very High**
- **Lightning:** High
- **Surge & Rough Sea:** Medium
- **Salinity intrusion:** Low–Medium
- **Fieldwork suitability:** **Low**
- **Operational notes:** High erosion/scour risk on channel bends; avoid heavy works on saturated embankments.

## September

- **Wind:** Medium
- **Rain:** High (monsoon tail still active)
- **Lightning:** High
- **Surge & Rough Sea:** Medium
- **Salinity intrusion:** Medium (salinity starts creeping back as monsoon weakens)
- **Fieldwork suitability:** **Medium**
- **Operational notes:** Use breaks between rain spells for embankment patching; begin cyclone-season readiness checks.

## October

- **Wind:** Medium–High
- **Rain:** Medium (can spike during cyclones/low-pressure systems)
- **Lightning:** Medium
- **Surge & Rough Sea:** **Very High** (peak Bay of Bengal cyclone season affecting Odisha–WB sector)
- **Salinity intrusion:** Medium–High
- **Fieldwork suitability:** **Medium–Low** (good days exist, but high alert needed)
- **Operational notes:**
  - Treat October as “**surge month**”: even if rainfall is lower than monsoon, water-level hazard is higher.
  - Pre-position relief boats, temporary shelters, embankment materials.

## November

- **Wind:** High (cyclone tail)

- **Rain:** Low–Medium (except cyclone events)
- **Lightning:** Low–Medium
- **Surge & Rough Sea: High–Very High** (still major cyclone risk window)
- **Salinity intrusion:** High (dry season setting in)
- **Fieldwork suitability: High on calm weeks / Low during alerts**
- **Operational notes:** Excellent month for surveys **if** no storm systems; maintain cyclone watch discipline.

## December

- **Wind:** Low
- **Rain:** Low
- **Lightning:** Low
- **Surge & Rough Sea:** Low
- **Salinity intrusion:** High
- **Fieldwork suitability: Very High**
- **Operational notes:** Best month for structured trainings, mangrove nursery planning, and longer field expeditions.

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## Extra layer Sundarbans planners must add: the lunar tide cycle

This calendar is monthly—but **your worst flood days** often cluster around **spring tides** (new moon/full moon), when astronomical high tides are highest. Because the Hooghly–Sundarban estuary experiences multi-meter tides and tidal amplification, a surge arriving on spring high tide is the “catastrophic combo.”

### Practical rule-of-thumb for operations:

- In **May + Oct–Nov**, treat the **±3 days around full moon/new moon** as “extra-high water-level sensitivity” periods.