REGIONAL WORKSHOP ON IMPACT-BASED FORECASTING:

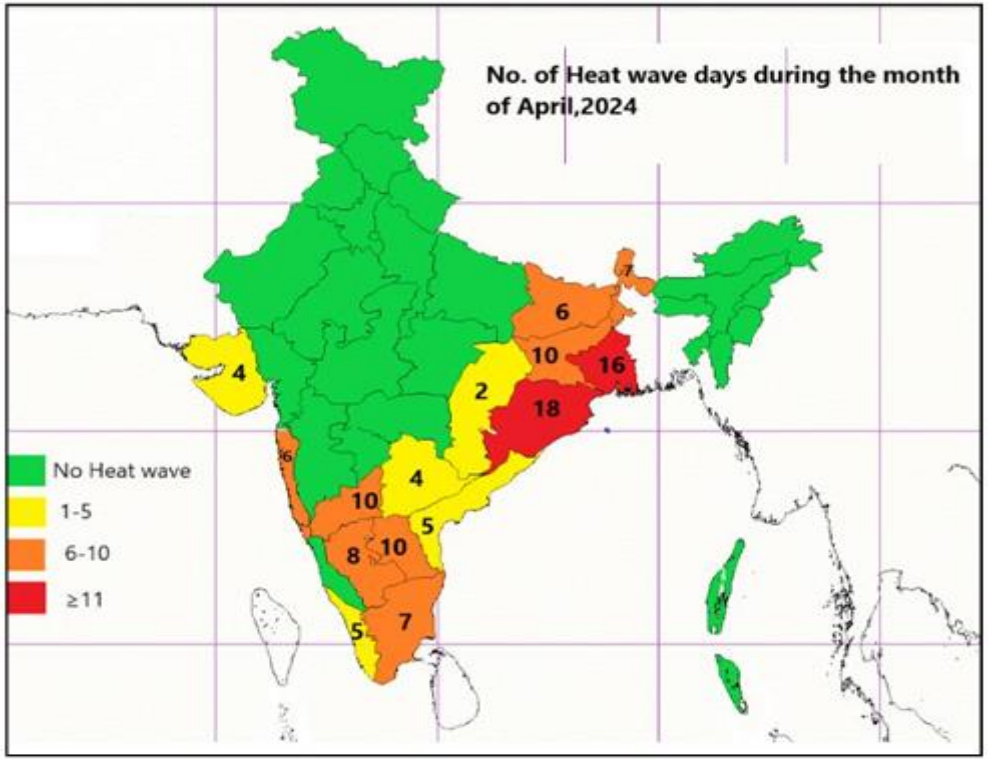
Action Oriented Advisories for Heat Wave & Cold Wave Issued by IMD and Requirements for IBF: Examples for the State of West Bengal

Sourish Bondyopadhyay, Scientist-D

09-13 February 2026

Kathmandu, Nepal

Heat Waves in Different States India in April, 2024



Special Bulletin for Heat Wave

भारत सरकार
पृथ्वी विज्ञान मंत्रालय
भारत मौसम विज्ञान विभाग
मौसम विज्ञान के उप
महानिदेशक
क्षेत्रीय मौसम विज्ञान केंद्र
4, डुएल् एवेन्यू, अलीपुर,
कोलकाता - 700027

Government of India
Ministry of Earth Sciences
India Meteorological Department
The Deputy Director General of Meteorology
Regional Meteorological Centre
4, Duel Avenue, Alipore,
Kolkata – 700027
Telephone No. 033 24793167/24790596
E-mail : kolkatarmc@gmail.com
drms.kolkata@gmail.com

No. W – 00102 / IX / **Date: 17.04.2024.**

Special Bulletin-03

Subject: Heat Wave Warning over the districts of South Bengal during 17th – 21st April, 2024.

Mainly dry westerly to north westerly wind at lower levels likely to prevail over the region and due to strong solar insolation heat wave condition / hot & humid weather is very likely to prevail over the districts of South Bengal during 17th – **21st April, 2024**.

Realised Maximum temperature summary as of 16.04.2024:

Heat wave conditions prevailed at one or two places over West Midnapore & West Burdwan district of Gangetic West Bengal. Yesterday's maximum temperature rose appreciably at one or two places over Gangetic West Bengal. No large change in yesterday's maximum temperature occurred elsewhere in the region.

Those were markedly above normal at one or two places West Bengal; above normal to appreciably above normal at most places over Gangetic West Bengal and normal elsewhere in the region.

Highest Maximum temperature recorded on 16.04.2024 was at Panagarh 42.8 (6.0) °C
(Details temperature distribution given in enclosed map)

Forecast: Rise in maximum temperature by 2-3 °C during next 3 days and no large change thereafter over the region. It is likely to be above normal by 3-5°C during next 2 days and above normal by 4-7°C in subsequent 3 days at many places over districts of South Bengal. Maximum humidity over coastal districts likely to be 80 -90% and over interior districts about 70 -80% and it is likely to be more than 40% during maximum period of the day.

Heat Wave Warnings:

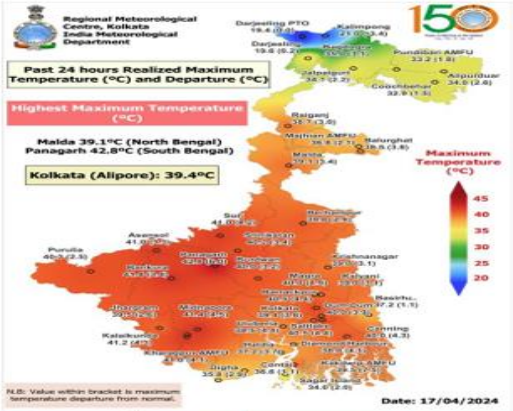
17.04.2024 & 18.04.2024 (Yellow warning (Watch)): - Heat Wave conditions very likely to prevail at one or two places over East Midnapore, West Midnapore, East Burdwan, West Burdwan, Bankura, Hooghly districts.

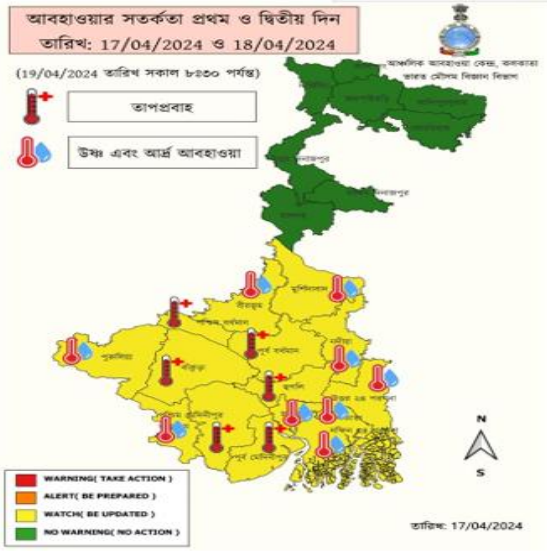
Hot and humid weather likely to prevail over rest districts of South Bengal.

19.04.2024 to 21.04.2024 (Orange warning (be prepared)): - 1) Heat Wave at a few places with Severe Heat Wave conditions at one or two places very likely to prevail over East Midnapore, West Midnapore, Jhargram, Purulia, Bankura, Birbhum, East Burdwan and West Burdwan districts.

2) Heat Wave conditions very likely to prevail at one or two places over rest districts of South Bengal.

Special Bulletin for Heat Wave (Graphics)





Impact & Advisories for Heat Wave

Possible Impact:

1. Heat is tolerable for general public but moderate health concern for vulnerable people e.g. infants, elderly, people with chronic diseases, people exposed to sun for prolonged period or doing heavy work.
2. Heat cramp, heat rash .

Action suggested:

1. Avoid prolonged heat exposure and outside work during 11AM to 4PM.
2. Wear light weight, light coloured, loose, cotton clothes. Cover your head: Use a cloth, hat or umbrella.
3. Drink sufficient water- even if not thirsty to avoid dehydration.
4. Use ORS, homemade drinks like lassi, torani (rice water), lemon water, buttermilk, etc. which help to re-hydrate the body.
5. Recognize the signs of heat stroke, heat rash or heat cramps such as weakness, dizziness, headache, nausea, sweating and seizures. If you feel faint or ill, see a doctor/ hospital immediately.

Special Bulletin for Heat Wave

भारत सरकार
पृथ्वी विज्ञान मंत्रालय
भारत मौसम विज्ञान विभाग
मौसम विज्ञान के उप
महानिदेशक
क्षेत्रीय मौसम विज्ञान केंद्र
4, डुएल एवेन्यू, अलीपुर,
कोलकाता - 700027

Government of India
Ministry of Earth Sciences
India Meteorological Department
The Deputy Director General of Meteorology
Regional Meteorological Centre
4, Duel Avenue, Alipore,
Kolkata – 700027
Telephone No. 033 24793167/24790596
E-mail : kolkatarmc@gmail.com
drms.kolkata@gmail.com

No. W – 00102 / IX / **Date: 29.04.2024.**

Special Bulletin-15

Subject: Heat Wave Warning over the districts of West Bengal during 29th April – 03rd May, 2024.

Mainly dry westerly to north westerly wind at lower levels continue to prevail over the region and due to strong solar insolation heat wave condition is very likely to prevail over the districts of West Bengal during 29th April – 03rd May, 2024.

Realised Maximum temperature summary of 28.04.2024:

Heat wave to Severe heat wave conditions prevailed in Howrah, South 24 Parganas, West Midnapore, West Burdwan, Birbhum, Malda districts.

Heat wave conditions prevailed in Kolkata, North 24 Parganas, Nadia, Bankura, Birbhum, Murshidabad, East Midnapore, Hooghly, East Burdwan, South Dinajpur districts.

Yesterday's maximum temperature rose appreciably i.e by 2-4 °C at a few places over North Bengal. No large change in yesterday's maximum temperature occurred elsewhere in the region.

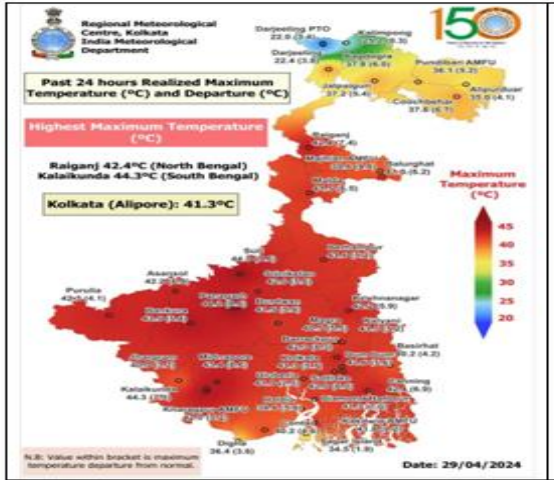
Those were markedly above normal (5 °C or more) at most places over South Bengal, at a few places over North Bengal; above normal (more than 2- 3 °C of normal values) to appreciably above normal(more than 3- 5 °C of normal values) at a few places over North Bengal, at one or two places over South Bengal and normal elsewhere in the region.

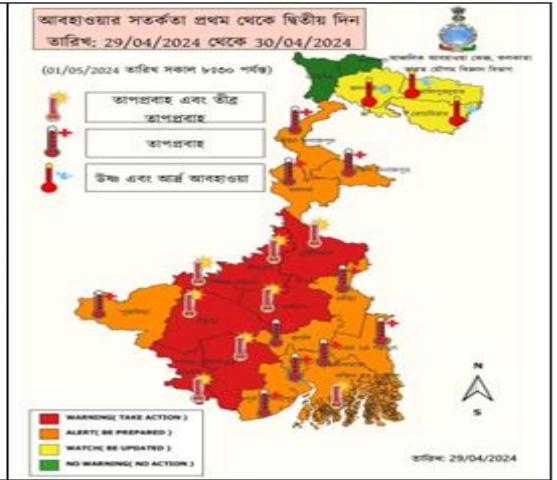
Highest Maximum temperature recorded on 28.04.2024 was at Raiganj 42.4 °C (+7.4) in North Bengal and Kalaikunda 44.3 °C (+7.5) in South Bengal.
(Detailed temperature distribution given in enclosed map)

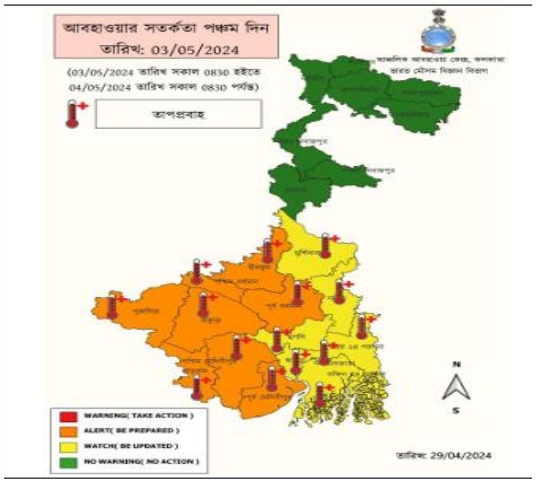
Forecast :

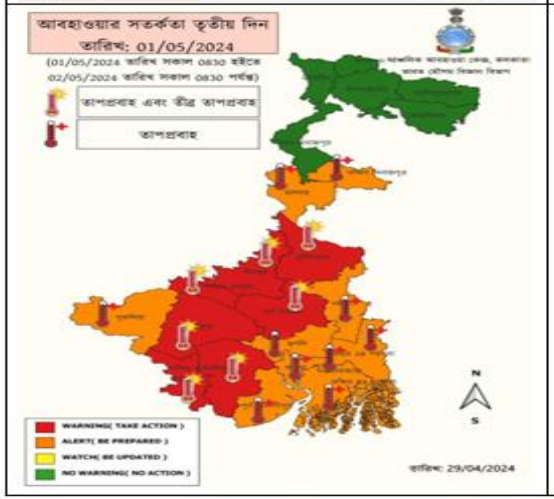
No large change in day temperature during next 5 days over the land area of the region.
Minimum relative humidity likely to be in the range of 20-40% during afternoon over the districts of West Bengal.
Maximum relative humidity likely to be in the range of 70-90% during afternoon over the districts of West Bengal.

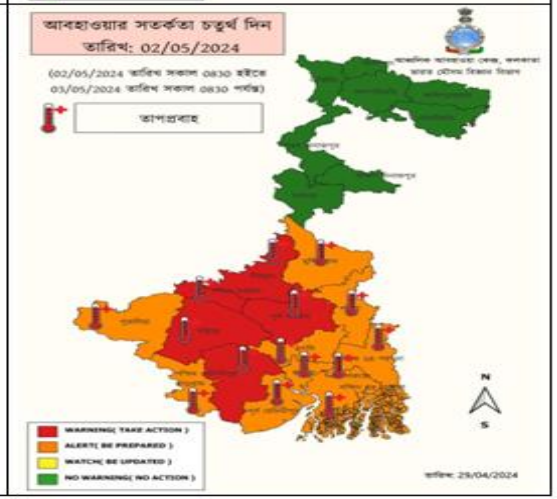
Special Bulletin for Heat Wave (Graphics)











Impact & Advisories for Heat Wave

Possible Impact:

1. Very high likelihood for heat related illness and possibility of heat strokes for red warning districts. Increased likelihood of heat illness symptoms in people who are either exposed to sun for a prolonged period or doing heavy work and Very high health concern for vulnerable people e.g. infants, elderly, people with chronic diseases for all other districts.
2. Heat cramp, heat rash.

Action suggested:

1. Extreme care needed for vulnerable people.
2. Avoid prolonged heat exposure and outside work during 11AM to 4PM.
3. Wear lightweight, light colored, loose, cotton clothes. Cover your head: Use a cloth, hat or umbrella.
4. Drink sufficient water- even if not thirsty to avoid dehydration.
5. Use ORS, homemade drinks like lassi, torani (rice water), lemon water, buttermilk, etc. which help to re-hydrate the body.
6. Recognize the signs of heat stroke, heat rash or heat cramps such as weakness, dizziness, headache, nausea, sweating and seizures. If you feel faint or ill, see a doctor/ hospital immediately.

Special Bulletin for Heat Wave

भारत सरकार
पृथ्वी विज्ञान मंत्रालय
भारत मौसम विज्ञान विभाग
प्रमुख - पूर्व क्षेत्र
प्रादेशिक मौसम केन्द्र
4, डुयेल एवेन्यू, अलीपुर,
कोलकाता - 700 027

Government of India
Ministry of Earth Sciences
India Meteorological Department
Head - Eastern Region
Regional Meteorological Centre
4, Duel Avenue, Alipore,
Kolkata-700 027

No. W – 00102 / IX / **Date: 02.05.2024**

Special Bulletin- 18

Subject: Heat Wave Warning over the districts of West Bengal during 02nd May – 05th May, 2024.

Mainly dry westerly to north westerly wind at lower levels continue to prevail over the region and due to strong solar insolation heat wave condition is very likely to prevail over the districts of West Bengal during 02nd May– 05th May, 2024.

Realised Maximum temperature summary of 01.05.2024:

Heat wave to severe heat wave conditions prevailed in Kolkata, Hooghly, Howrah, North & South 24 Parganas, East & West Midnapore, Jhargram, West Burdwan, North & South Dinajpur, Malda districts.

Heat wave conditions prevailed in Nadia, Bankura, Birbhum, East Burdwan, Murshidabad, Purulia districts.

Yesterday's maximum temperature rose appreciably i.e by 2-4 °C at one or two places in the coastal areas and fell appreciably at one or two places towards interior areas of South Bengal and no large change occurred elsewhere in the region.

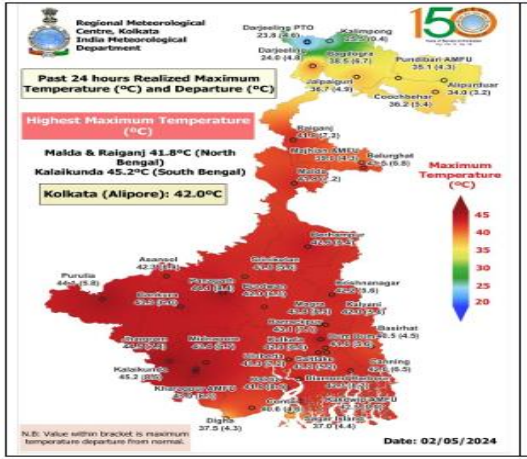
Those were markedly above normal (5 °C or more) at most places in South Bengal and at a few places in North Bengal; appreciably above normal (3-5 °C from Normal) at many places in North Bengal and at one or two places in South Bengal; above normal (2-3 °C from Normal) at one or two places in North Bengal and normal elsewhere in the region.

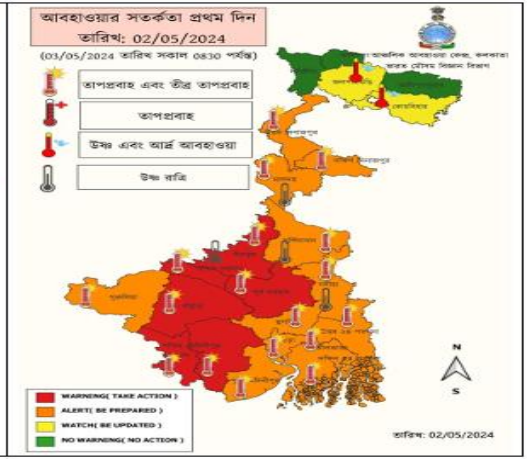
Highest Maximum temperature recorded on 01.05.2024 was at Kalaikunda 45.2 °C (+8.5) in South Bengal and at Malda & Raiganj 41.8 °C (+7.2) in North Bengal.
(Detailed temperature distribution given in enclosed map)

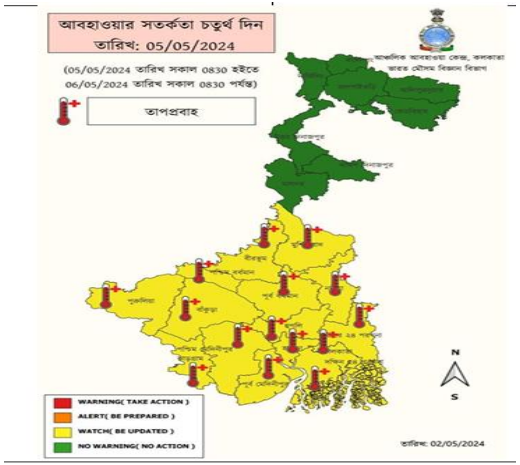
Forecast :

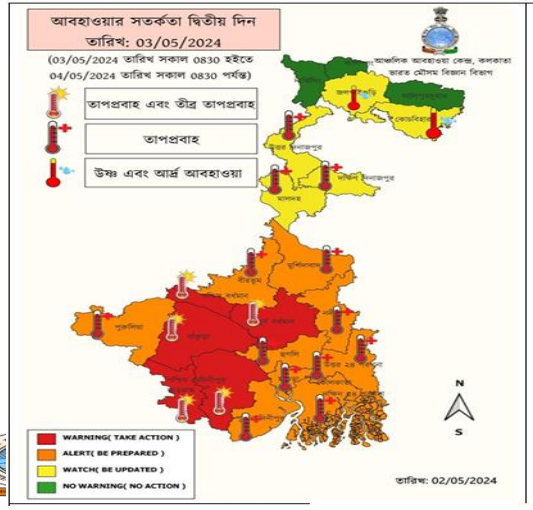
Maximum temperature likely to fall gradually by 2-3 °C during next 4-5 days.
Minimum relative humidity likely to be in the range of 20-30% during afternoon over the districts of West Bengal.
Maximum relative humidity likely to be in the range of 60-90% during morning hours over the districts of West Bengal.

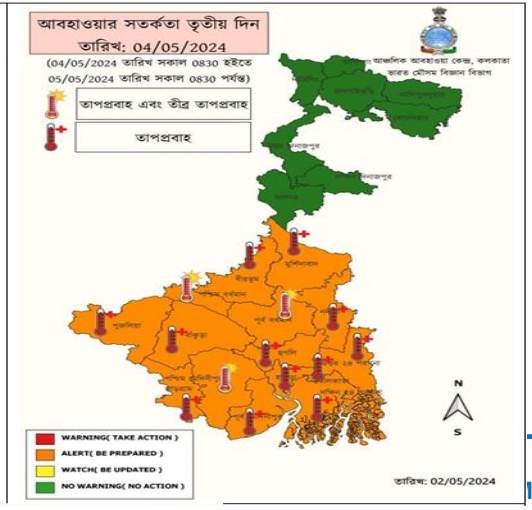
Special Bulletin for Heat Wave (Graphics)











Terminologies

SPATIAL DISTRIBUTION (% of Stations reporting)

% Stations	Category	% Stations	Category
76-100	Widespread (WS/Most Places)	26-50	Scattered (SCT/ A Few Places)
51-75	Fairly Widespred (FWS/ Many Places)	1-25	Isolated (ISOL)

WARNING

WARNING (TAKE ACTION)
ALERT (BE PREPARED)
WATCH (BE UPDATED)
NO WARNING (NO ACTION)

Probabilistic Forecast

Terms	Probability of Occurrence (%)
Unlikely	< 25
Likely	25 - 50
Very Likely	50 - 75
Most Likely	> 75

Color code for IBF graphics/table

Risk and Response Matrix:

Risk Matrix						Risk Level	Response
Likelihood	HIgh						
	Medium					High	Take Action
	Low					Medium	Be Prepared
	Very Low					Low	Be Aware
		Minimal	Minor	Significant	Severe	Very Low	No Action
		Potential Impacts					

Agromet Advisory

AMFU KHARAGPUR : (Purulia, Bankura , Paschim Midnapore , Jhargram & Birbhum)

Agromet advisory:

Agroclimatic zonewise Agricultural/Agro meteorologicalAdvisories

	GENERAL	(I) As temperature rise is expected in the next five days, farmers should spray pesticides early morning or late evening and wear protective gear for safety. (II) Harvest matured crops early morning to avoid heat stress due to the expected temperature rise and store them in a dry, safe place. (III) Prune damaged or diseased plant parts in fruit orchards and vegetable crops to		
		improve air circulation and reduce the risk of fungal infections. (IV)Apply light and timely irrigation to maintain soil moisture but avoid waterlogging. (V) Inspect stored grains for pest infestations and maintain proper ventilation to avoid mold growth due to residual moisture.		

Agromet Advisory

DISTRICT	CROPS/LIVESTOCKS	STAGE	LIKELY IMPACT ON CROP	ADVISORY
Paschim Medinipur, Jhargram, Bankura, Birbhum and Purulia	Boro Rice	Grain filling		At the grain filling to maturity stage of Boro rice, farmers are advised to maintain a shallow water level of 2–3 cm in the fields to prevent heat stress and support proper grain development. With temperatures expected to rise in the next five days, timely irrigation during early morning or late evening hours is crucial to minimize heat-induced sterility and maintain canopy temperature. Avoid any irrigation 10–15 days before harvest to promote uniform ripening and ease of harvesting. Field activities, including spraying of fertilizers or pesticides, should be suspended during high temperatures to prevent crop damage and ensure farmer safety. Watch for pests such as gundi bugs or grain-sucking insects and plan control measures only after the weather stabilizes. Chemical control measures like spraying Chlorantraniliprole 18.5% SC @ 0.4 ml/L of water, Fention 100 EC @ 500 ml/ha, Malathion 50 EC @ 500 ml/ha, Triflumezopyrin 10% SC @ 95 g/acre or Pymetrozine 50% WG @ 120 g/acre should be carried out only during calm and dry weather conditions. Harvest the crop promptly once it reaches physiological maturity and dry the grains under shade to maintain

Agromet Advisory

Sesame	Vegetative		In view of the rising temperatures and a heat wave warning over the next five days, farmers are strongly advised to take precautionary steps to safeguard sesame crops during the vegetative stage. Ensure weed-free conditions and provide one light irrigation of 3 cm depth during the early morning or late evening hours at the 4–5 leaf or branching stage to reduce heat stress and promote healthy growth. Avoid irrigation during peak afternoon heat to prevent thermal shock. If facilities are available, continue irrigation at 15–20 day intervals while avoiding overwatering. Due to increased heat, crops may experience wilting or reduced vigor—monitor plant health closely.For pest and disease management, check for damage from leaf and pod caterpillars; remove any infested plant parts. To curb early pest pressure, spray Azadirachtin 0.03% @ 5 ml/litre at 7 days after sowing and again at 20 DAS during cooler hours of the day. Uproot and destroy any plants showing symptoms of leaf curl or phyllody to prevent disease spread, and do not use seeds from diseased plants for sowing.

Agromet Advisory

Poultry			•With rising temperatures, farmers should provide a balanced diet rich in proteins, vitamins, and minerals to maintain poultry health and egg production. Adding electrolytes and vitamin supplements to drinking water will help birds cope with heat stress. Ensure birds have constant access to clean, cool water, and clean water containers regularly to prevent contamination. •Proper airflow in poultry sheds is essential to reduce heat stress. Use exhaust fans or open-sided sheds, sprinkle water on the roof or around the poultry house, and provide adequate shade. Avoid overcrowding to ensure birds remain comfortable in high temperatures. •The risk of diseases like Newcastle Disease (Ranikhet) and Fowl Pox increases with heat. Farmers should follow a proper vaccination schedule and monitor birds for early signs of illness such as reduced feed intake, lethargy, or respiratory distress. Isolate sick birds immediately and consult a veterinarian.

Agromet Advisory

Cattle			• With the increasing temperature and a shortage of green fodder in the field, farmers are advised to ensure proper nutrition for their cattle. Feeding a urea and jaggery mixture with paddy straw or urea-treated paddy straw will help improve digestibility, enhance nutrient absorption, and support better milk production. • Cattle should be provided with ample clean drinking water to prevent dehydration. Mineral mixtures and salt licks should be included in the diet to maintain electrolyte balance and prevent heat stress. Farmers should ensure proper ventilation in cattle sheds and provide shade or cooling measures like sprinkling water to keep the animals comfortable. • With rising temperatures, there is an increased risk of Foot and Mouth Disease (FMD). Farmers are strongly advised to ensure timely FMD vaccination to protect livestock from this highly contagious disease. Regular monitoring for symptoms such as salivation, blisters on the mouth and hooves, and reduced feed intake is crucial. In case of any symptoms, isolate the affected animals and seek veterinary assistance immediately.

Agromet Advisory

Fisheries			• With rising temperatures, oxygen levels in ponds may decrease, stressing the fish. Farmers should aerate the water using paddlewheels or air pumps and maintain a water temperature of 25-30°C for healthy fish growth. • High temperatures can affect fish metabolism. Farmers should provide high-quality, protein-rich feed in the early morning or late evening when temperatures are moderate. Avoid overfeeding, as uneaten feed can deteriorate water quality and lead to disease outbreaks. • Warmer conditions increase the risk of fungal and bacterial infections like gill rot and fin rot. Farmers should apply probiotics or herbal supplements to improve fish immunity. Regularly inspect fish for signs of disease, such as erratic swimming, discoloration, or lethargy,
			and seek veterinary advice if needed.

Special Bulletin for Cold Wave

भारत सरकार
पृथ्वी विज्ञान मंत्रालय
भारत मौसम विज्ञान विभाग
प्रमुख - पूर्व क्षेत्र
प्रादेशिक मौसम केंद्र
4, डुएल एवेन्यू, अलीपुर,
कोलकाता - 700027

Government of India
Ministry of Earth Sciences
India Meteorological Department
The Head – Eastern Region
Regional Meteorological Centre
4, Duel Avenue, Alipore, Kolkata – 700027
Telephone No. 033-24793167/24491072
E-mail : ddgm.rmckolkata@imd.gov.in ,
drms.kolkata@gmail.com

No. RMCKOL-13020/4/2025-RWFC-KOL

Date: 06.01.2026
Time: 1330 Hrs. IST

Special Bulletin No. 01

Sub: Cold day & Cold Wave conditions over the districts of West Bengal.

A well-marked low pressure area lies over southeast Bay of Bengal and adjoining east Equatorial Indian Ocean in early morning and persisted over the same region at 0830 hrs IST of today, the 6th January 2026. The associated cyclonic circulation extends upto 5.8 km above mean sea level. It is likely to move west-northwestwards and intensify into a depression over southwest Bay of Bengal during next 24 hours. Thereafter, it is likely to continue to move west-northwestwards across southwest Bay of Bengal during subsequent 48 hours. A cyclonic circulation lies over Tripura & neighbourhood and extends upto 1.5 km above mean sea level.
Strong northwesterly/ northerly winds at lower tropospheric levels likely to prevail over West Bengal.

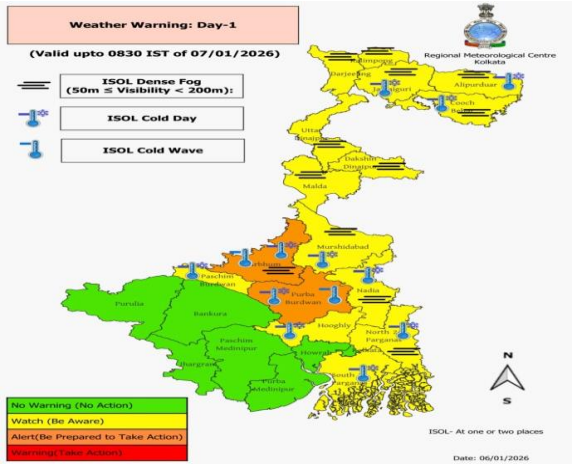
Minimum Temperature Forecast

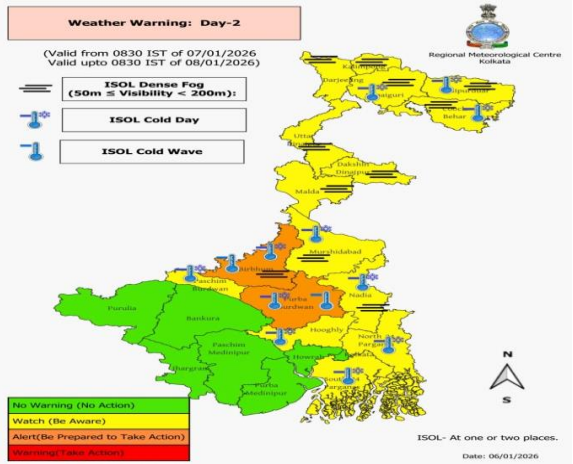
No large change in Minimum temperature (Night Temperature) for next 04 days thereafter slight rise by about 2°C over the districts of West Bengal. Minimum temperature very likely to be below normal by 2 - 4°C during next 4 days at most places over West Bengal.

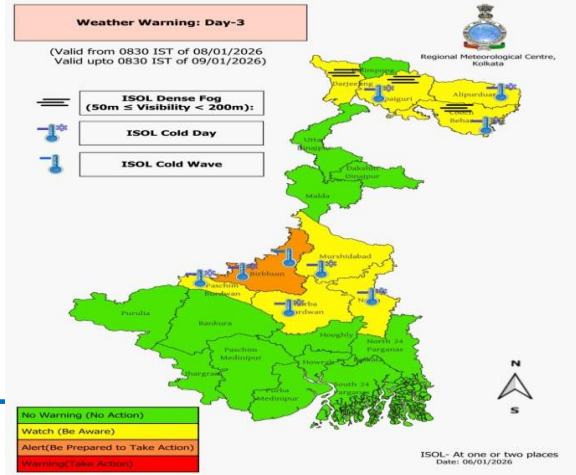
Maximum Temperature Forecast

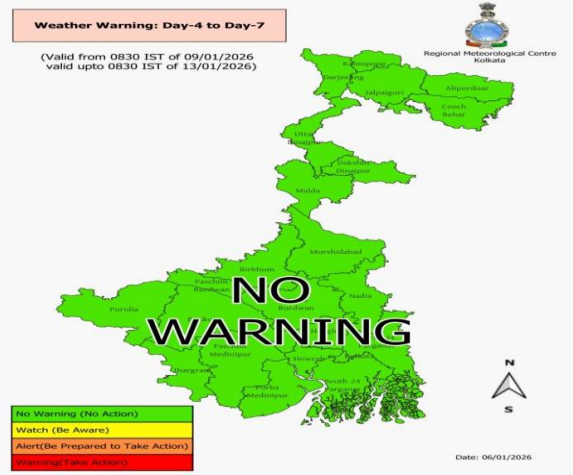
Maximum temperature (Day temperature) likely to be below normal by 3 - 5 °C at many places over the districts of South Bengal during next 03 days.
Maximum temperature (Day temperature) likely to be below normal by 4 - 6 °C at many places over the districts of North Bengal during next 03 days.

Special Bulletin for Cold Wave (Graphics)









Impact & Advisories for Cold Wave

Possible Impact for West Bengal:

Cold is tolerable but mild health concern for vulnerable people (Infants, elderly, people with chronic diseases etc.)

- May affect some airports, highways and railway routes in the areas due to low visibility condition.
- Difficult driving conditions with slower journey times.

Actions suggested:

- Avoid prolonged exposure to cold.
- Wear several layers of loose fitting, light weight; warm woolen clothing.
- Careful while driving or outing through any transport.
- Use fog lights during driving.
- Be in touch with airlines and Railway and State transport for the schedule of your journey.
- Avoid outing during morning hours especially old age, infants and people having asthma bronchitis etc.

Warning maps are given at the end for graphical information.

N.B: Spatial rainfall distribution: Isolated: =< 25%, A few: 26-50%, Many: 51-75%, Most: 76-100%, Rainfall amount (mm): Heavy rain: 64.5 – 115.5, Very heavy rain: 115.6 – 204.4, extremely heavy rain: 204.5 or more. Probabilistic forecast: Unlikely =< 25%, likely 26-50%, Very likely 51-75%, Most likely > 75%

Color code for Warning:

No Warning (No Action)	Alert (Be Prepared To Take Action)
Watch (Be Aware)	Warning (Take Action)

Multiple Dissemination Channels

Multiple Dissemination Channels to reach different users and the furthest corners of the society- website, email, WhatsApp, sms, Radio, TV, Briefing, Print & Electronic media, Social media, Common Alert Protocol (CAP) etc.

https://mausam.imd.gov.in

https://imdgeospatial.imd.gov.in
https://mausam.imd.gov.in/kolkata
YouTubehttp://www.youtube.com/@rmckolkata
https://www.facebook.com/WeatherOffice.Kolkata
https://x.com/ImdKolkata
https://www.instagram.com/rmckolkata/

Common Alert Protocol (CAP) for large scale dissemination

सचेत Integrated Alert System

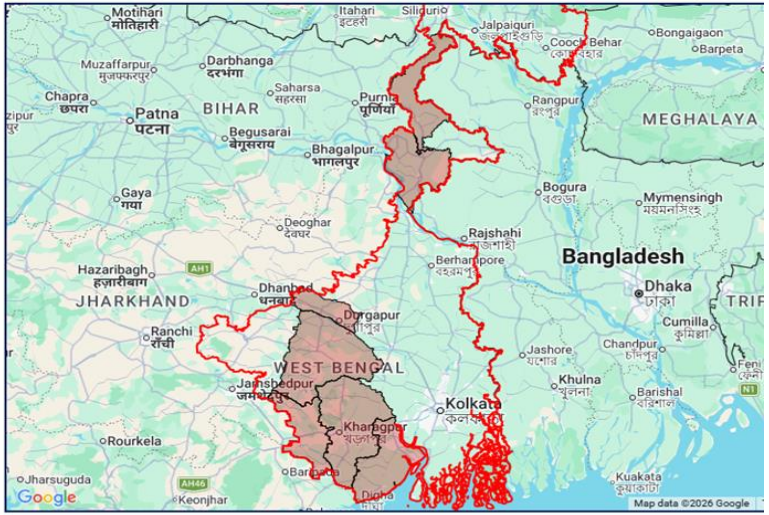
आज़ादी का अमृत महोत्सव

All Warnings View Detailed Cyclone Warnings

Last update

Selected Warning Details

Sender Name:	IMD Kolkata	**Entry Date & Time:**	25 Apr 2024, 5:57 PM
Time of Issue(Effective Date & Time):	25 Apr 2024, 6:00 PM	**Valid Upto:**	26 Apr 2024, 6:00 PM
Area Description	Bankura, Jhargram, Maldah, Paschim Bardhaman, Pashchim Medinipur, Purba Medinipur, Uttar Dinajpur districts of West Bengal		
Event Description:	Severe Heat wave	**Urgency:**	Immediate
Severity:	WARNING	**Certainty:**	Very Likely
Message Body:	Message in English:	Heat wave to severe heat wave condition is very likely to occur over Bankura, Jhargram, Paschim Bardhaman, Pashchim Medinipur, Purba Medinipur, Malda, Uttar Dinajpur districts during 26-04-24 to 29-04-24.	
	Message in Bengali:	26-04-24 থেকে 29-04-24 তারিখের মধ্যে বাঁকুড়া,ঝাড়গ্রাম,পশ্চিম বর্ধমান,পশ্চিম মেদিনীপুর,পূর্ব মেদিনীপুর,মালদা,উত্তর দিনাজপুর জেলাগুলিতে তাপপ্রবাহ থেকে তীব্র তাপপ্রবাহের সম্ভবনা।	
Forwarding Status:	Notified to West Bengal SDMA	**Dissemination Status:**	Public Dissemination Completed
Warning Generated By:	IMD Kolkata	**User Contact No:**	
Instruction:	Please follow SDMA guidelines.		
Warning Status:	VIEW		



Dissemination Statistics

Area Description	Authority/ Agency	Statistics
Bankura, Jhargram, Maldah, Paschim Bardhaman, Pash..	TSP-SMS	217156 SMS
	Mobile Application	Received by 1567 out of 4541 subscribers
	Browser Notification	Received by 8 out of 54 subscribers

Minimum Operational Requirements for Heat Wave/ Cold Wave IBF

- SOP for Forecasting
- Climatology for Hazard and map for Exposure & Vulnerability
- Input from all Stakeholders for refining assessment of exposure and vulnerability
- Observational network (surface, upper level, satellite, radar etc.) with reasonable spatial and temporal resolution
- Analysis of observed data and derived products

- Medium range Forecasting NWP Model
- Higher attention to the accurate Hazard Forecast and lead time
- Seamless forecast for adequate time for preparedness and action
- Information of accuracy of Model/product and uncertainty

- Screening of all available observational inputs and Forecast before finalization of IBF and dissemination
- Dissemination through Multiple dissemination channels
- Awareness program

- **IBF should be issued with whatever data/information available from authentic/ reasonable source**

Requirements of Expansion for Heat Wave/ Cold Wave IBF

- Dense Observational network for automatic & continuous observations
- Quality check for all observational data
- Precise analysis of observed data and derived products, assessment of significance of products

- High resolution NWP models for hazard and specialized model for Heat Wave/ Cold Wave IBF
- Higher lead time and accuracy
- Deterministic & probabilistic forecast

- Separate Impact tables for separate regions and dynamic
- Accommodate multi-hazard scenario
- Incorporate non-meteorological factors
- General and sector specific IBF as per user requirements

- Speedy and user-friendly dissemination
- More Automation
- Continuous interaction and feedback from stakeholders


भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT
आदित्यात् जायते वृष्टिः

Thank You