



**Government of India
Ministry of Earth Sciences (MoES)
India Meteorological Department
Meteorological Centre, Shimla**

Monsoon Report 2023

1. Main Features:-

- I. Monsoon arrived in most part of Himachal Pradesh on 24th June 2023 earliest onset was on 09th June 2000 and most delayed onset on 05th July 2010.
- II. The Southwest monsoon seasonal (June to September) rainfall had been Normal over the State with 884.8mm of actual rainfall during monsoon 2023 against its normal 734.4 mm with 20% departures.
- III. Actual Rainfall in months of June, July, August and September was 121.7mm, 448.9mm, 247.6mm and 69.6mm respectively.
- IV. Extremely heavy rainfall was observed in district Kangra, Hamirpur, Chamba, Una, Bilaspur, Sirmaur and Mandi at isolated places.
- V. Himachal Pradesh faced number of landslides, flash floods, cloudbursts during the entire monsoon season (June-September) leading to extensive damage to material and human lives.
- VI. For the period of 1901 to 2023, the state had received highest rainfall in the year 1922 with actual rainfall of 1314.6mm and State has received 36th highest rainfall during this year in monsoon.

2. Progress of Monsoon:-

- I. Light to moderate rainfall occurred from 01st June to 21st June. First spell of heavy rainfall occurred on 06th June at Bijahi in Mandi district. With spell of Heavy to very heavy rainfall during 22nd to 24th June at few places.
- II. **Very heavy rainfall**-Number of Spells in June, July, August and September are one, Seven, Five and Two respectively
- III. **Extremely heavy rainfall**- Number of Spells in June, July, August and September are Nil, One, Two, Nil respectively.
- IV. In the beginning of monsoon in June Month for 1st three weeks state had received deficient rainfall then in 4th week of June state had received excess rainfall due to spell of Heavy to very Heavy Rainfall as mentioned above. In the month of July, 08th July to 12th July State had received large excess rainfall. In the month of August, 11th August to 14th August and 23rd August State had witnessed Active to vigorous monsoon activity resulting in large excess rainfall. In month of September, state had received large excess in many places in 3rd week.

2.1. Time Series:-

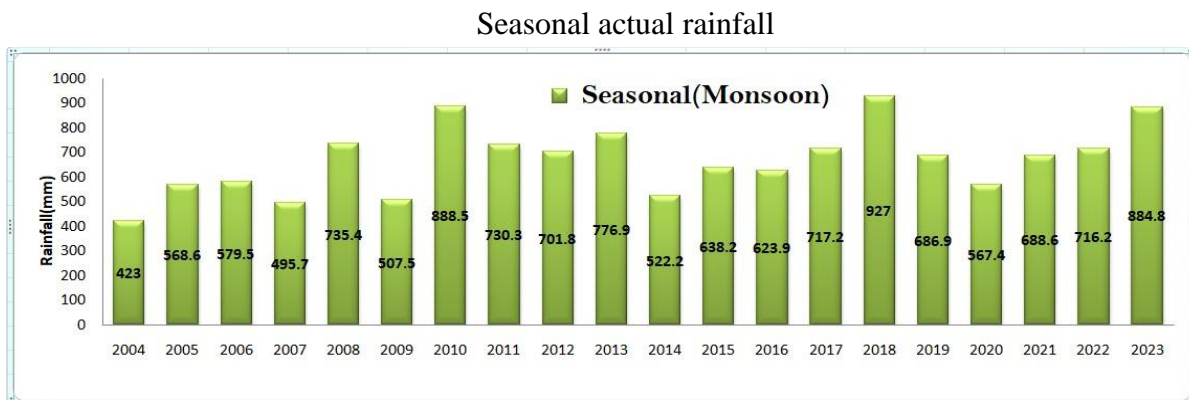
Weekly Rainfall Departure Monsoon-2023																	
District	7-Jun-23	14-Jun-23	21-Jun-23	28-Jun-23	5-Jul-23	12-Jul-23	19-Jul-23	26-Jul-23	2-Aug-23	9-Aug-23	16-Aug-23	23-Aug-23	30-Aug-23	6-Sep-23	13-Sep-23	20-Sep-23	27-Sep-23
Bilaspur	-100	-21	-85	118	-6.0	412	7	-54	-64	4	219	206	-18	-56	-38	180	-46
Chamba	-90	-76	-34	114	-51.0	250	62	-2	-47	64	32	-60	-40	-50	-96	190	-96
Hamirpur	-100	-32	-81	180	-57.0	299	5	-32	-37	-31	196	85	-45	-77	-87	293	-91
Kangra	-97	-66	-34	73	-14.0	87	38	-29	-53	-31	158	-18	-33	-39	-63	219	-84
Kinnaur	-53	-18	-50	-23	-60.0	661	50	24	2	-81	-39	-97	9	-94	-83	18	-100
Kullu	23	-72	-73	132	-61.0	576	153	57	-31	-78	42	-67	-3	-98	-99	174	-88
Lahaul & Spiti	-100	-98	-85	-80	-99.0	439	-56	-79	-90	-98	-90	-98	-100	-98	-99	-25	-100
Mandi	-71	-49	-48	248	-56.0	173	63	-45	-17	-41	283	46	8	-55	-91	48	-80
Shimla	-37	-76	-49	161	-9.0	486	102	86	41	-64	201	5	10	-81	-81	21	-99
Sirmaur	-48	-84	-10	154	-8.0	475	103	120	-73	-46	-12	-56	-25	-85	-33	105	-99
Solan	-96	-67	-41	261	-16.0	501	22	81	-46	-12	133	162	19	-94	-91	17	-79
Una	-100	0	-88	-37	-26.0	291	-50	-45	-91	-54	82	4	-67	-99	-83	299	-20
Himachal Pradesh	-63	-67	-51	116	-37.0	320	46	-1	-45	-53	102	-16	-32	-71	-80	109	-89

Cummulative Rainfall Departure Monsoon-2023																	
District	7-Jun-23	14-Jun-23	21-Jun-23	28-Jun-23	5-Jul-23	12-Jul-23	19-Jul-23	26-Jul-23	2-Aug-23	9-Aug-23	16-Aug-23	23-Aug-23	30-Aug-23	6-Sep-23	13-Sep-23	20-Sep-23	27-Sep-23
Bilaspur	-100	97	14	54	34	151	120	85	58	48	75	86	77	69	63	67	64
Chamba	-90	-26	-28	19	0	77	73	57	40	22	23	17	13	10	4	10	6
Hamirpur	-100	56	-6	64	19	105	81	59	40	28	61	63	54	47	41	47	43
Kangra	-97	3	-14	23	10	37	37	22	7	1	22	18	14	11	8	14	12
Kinnaur	-53	35	-2	-7	-17	156	135	115	100	76	60	44	41	29	21	21	12
Kullu	23	32	-9	27	6	175	170	148	119	90	83	71	66	57	49	53	47
Lahaul & Spiti	-100	-41	-59	-64	-74	97	58	28	10	-6	-15	-22	-29	-34	-38	-37	-41
Mandi	-71	-2	-21	81	44	84	79	54	41	29	63	61	58	52	46	46	43
Shimla	-37	32	0	48	33	154	144	133	119	94	107	98	93	82	72	70	64
Sirmaur	-48	7	0	56	33	168	151	145	110	88	76	64	58	49	45	46	42
Solan	-96	52	14	98	64	193	156	142	114	96	101	106	100	88	78	76	71
Una	-100	110	27	4	-8	92	56	35	12	1	15	14	8	0	-3	5	5
Himachal Pradesh	-63	7	-16	28	8	106	91	72	52	36	45	39	34	28	22	25	21

3. Monthly Rainfall:-

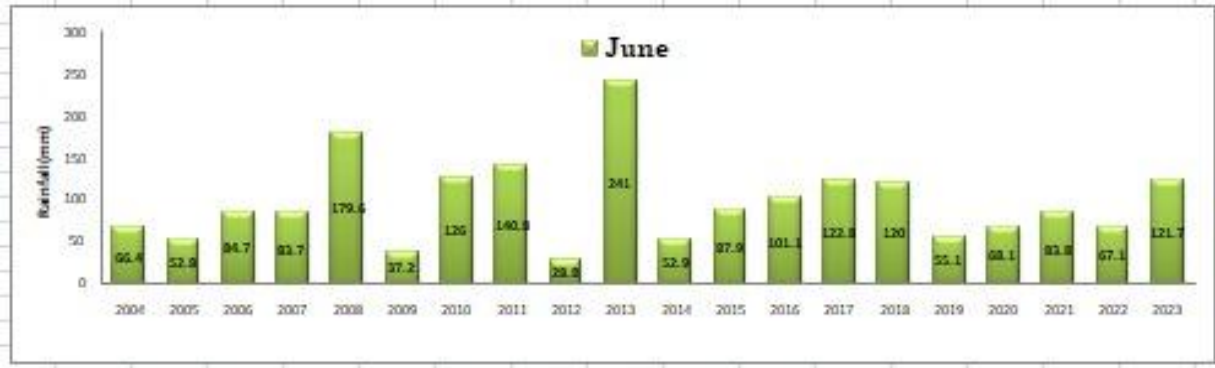
Rainfall	Actual(mm)	Normal(mm)	Departure (%)
Month			
June	120.7	101.1	19
July	448.1	255.9	75
August	246.4	256.8	-4
September	69.6	120.5	-42
Season	884.8	734.4	20

4. Monthly rainfall Departure (%) comparison from 2004-2023:-

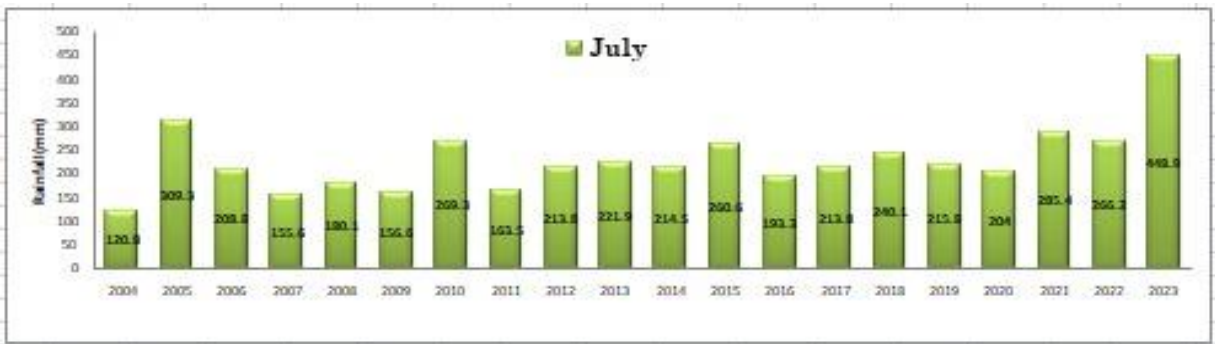


From 2000 onwards -State had received highest rainfall in 2018 (927.0mm) and 2023 has received 03rd highest rainfall.

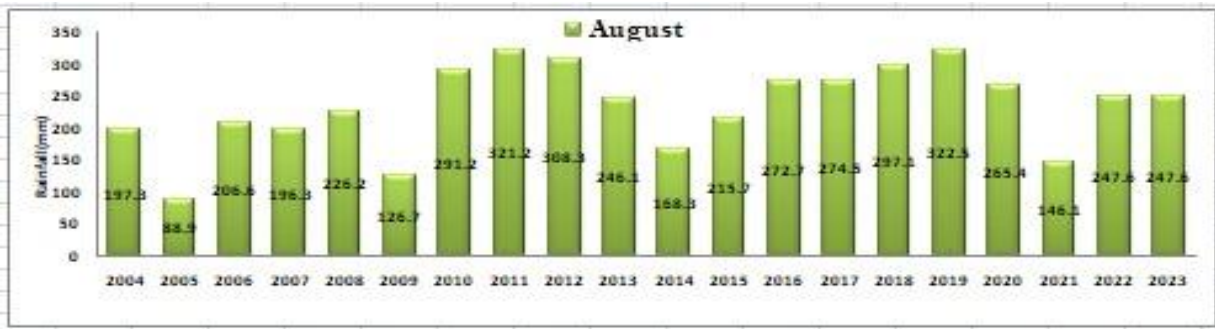
June Month Actual Rainfall



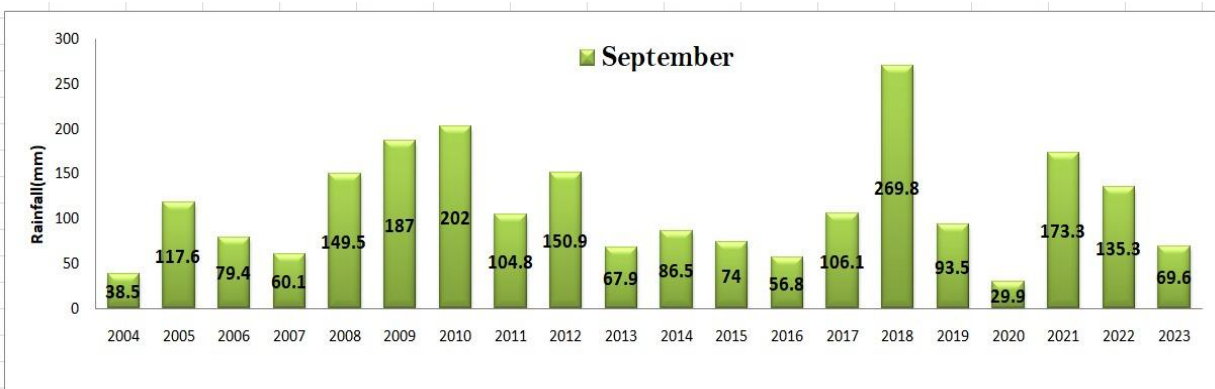
July Month Actual Rainfall



August Month Actual Rainfall



September Month Actual Rainfall



5. Extremely Heavy rainfall during Monsoon season:-

<u>Date</u>	<u>Station</u>	<u>Amount</u>	<u>District</u>
09-07-2023	Una Rampur Aws	228.5	Una
	R L Bbmb	224.0	Bilaspur
10-07-2023	Pachhad	220.3	Sirmaur
11-07-2023	Nahan	250.0	Sirmaur
	Jatton Barrage	238.0	Sirmaur
14.08.2023	Kangra Aero	273.4	Kangra
	Sujanpur Tira	254.0	Hamirpur
	Dharmsala	250.2	Kangra
	Chuari	234.0	Chamba
	Palampur	220.0	Kangra
23-08-2023	Kahu	213.6	Bilaspur
	Kataula	210.2	Mandi

6. District wise Cloud burst Events in HP during July and August 2023(Source- State Disaster Management Authority) Govt of HP:-

DISTRICT	July	August
CHAMBA	2	-
KANGRA	-	-
KINNAUR	5	-
KULLU	26	-
LAHAUL & SPITI	1	-
MANDI	2	4
SHIMLA	8	-
SIRMAUR	-	2
SOLAN	1	1

7. Records-

24 hours New Rainfall Records for Himachal Pradesh in July 2023

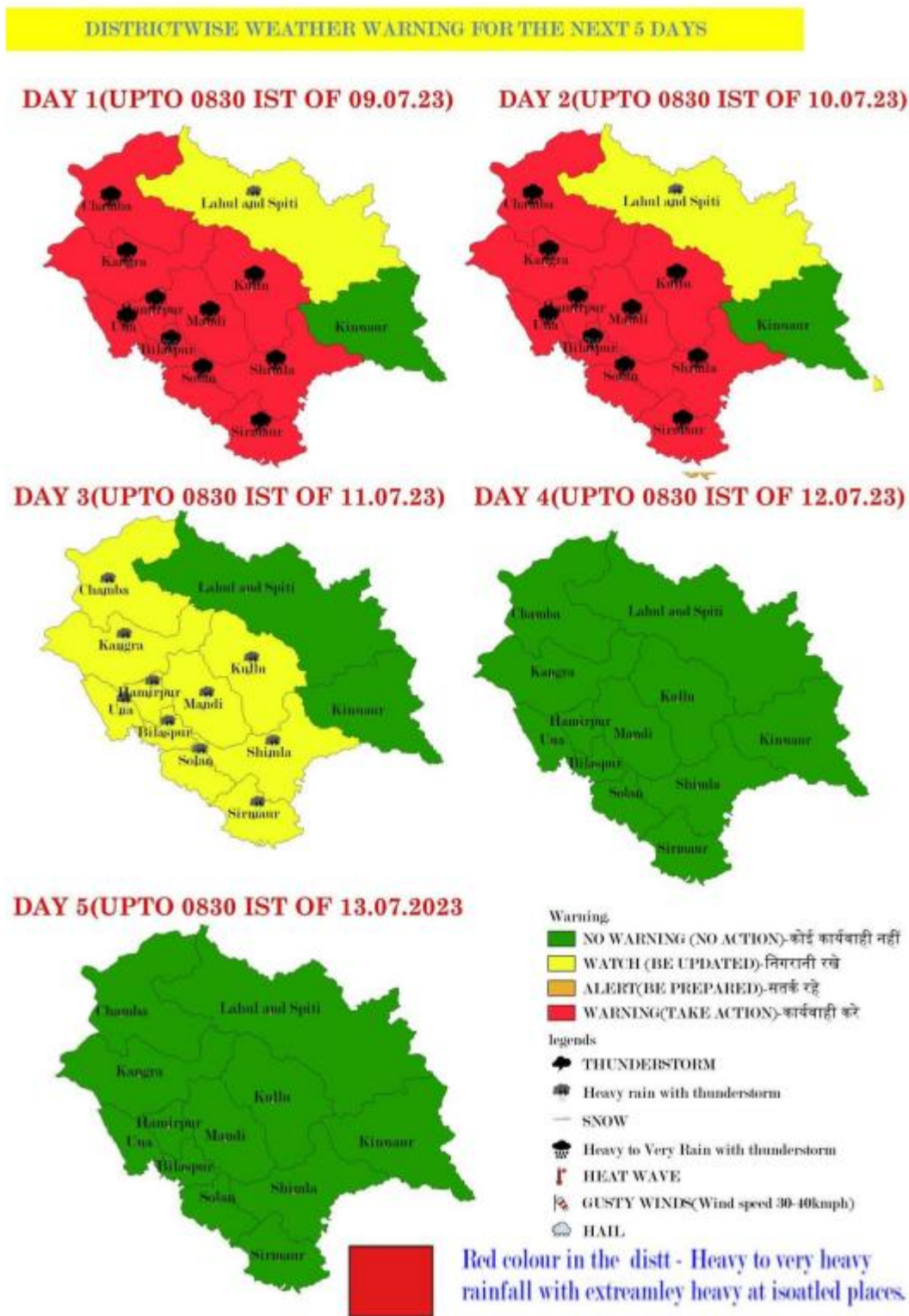
24 hours New Rainfall Records for July 2023 for Himachal Pradesh					
Station	District	New All Time Record		Previous All time record	
		Rainfall (in mm)	Date of July 2023)	Rainfall (in mm)	Date
Manali	Kullu	131.3	9	105.1	09 July, 1971
Una	Una	228.5 (AWS)	9	224	22 July, 1927
Keylong	Lahaul & Spiti	83 (AWS)	9	78	28 July, 1951
Rohru	Shimla	185	9	170	25 July, 1966
Ghamror	Kangra	166	9	164.8	19 July, 2021
Pachhad	Sirmaur	220	10	189.2	26 July, 1973
Nadaun	Hamirpur	160.5	9	146	30 July, 1996

24 hours New Rainfall Records for August 2023 for Himachal Pradesh:-

Stations	New Record-Amount(Date)	Previous Record(Date)
Bijahi	102.0(14 th Aug2023)	99.2(18 th August, 2019)
Kataula	172.3(14 Aug2023) 210.2(23 th Aug 2023)	165.0(20 th August, 2022)
Pandoh	166.0 (14 Aug2023) 178.0(23 th Aug 2023)	137.0 (13 th Aug2011)

8. Impact based weather forecast:-

Whenever there are extreme weather events impact based forecast issued from time to time. Forecast and alerts have been issued on timely basis are as follow.



Sender Name:	IMD Shimla	Entry Date & Time:	12 Aug 2023, 4:21 PM
Time of Issue:	12 Aug 2023, 4:00 PM	Valid Upto:	12 Aug 2023, 7:00 PM
Area Description	Districts of Himachal Pradesh		
Event Description:	Moderate Rain	Urgency:	Expected
Severity:	ALERT	Certainty:	Very Likely
Message Body:	Message in English:	Moderate Rain is very likely to occur over Bilaspur, Chamba, Hamirpur, Kangra, Kinnaur, Kullu, Mandi, Shimla, Sirmaur, Solan and Una with Heavy at isolated place during next 3 hours.	
	Message in Hindi:	अगले 3 घंटों के दौरान बिलासपुर, चंबा, हमीरपुर, कांगड़ा, किन्नौर, कुल्लू, मंडी, शिमला, सिरमौर, सोलन और ऊना में मध्यम बारिश और कुछ स्थानों पर भारी बारिश होने की संभावना है।	
Forwarding Status:	Notified to Himachal Pradesh SDMA	Dissemination Status:	Pushed to Dissemination Media by concerned SDMA
Warning Generated By:	IMD Shimla	User Contact No:	9418932167
Instruction:	Check for traffic congestion on your route before journey.		
Warning Status:	VIEW		

REGENERATE WARNING



Date: August 13, 2023 METEOROLOGICAL CENTRE, SHIMLA Time of Issue: 1800
 NOWCAST - HIMACHAL PRADESH Validity: 1800-2100

SHIMLA CITY NOWCAST

Light to moderate rainfall likely to occur with poor visibility condition.
Shrikhand Mahadev
 Light rainfall and poor visibility condition.

CATCHMENT AREA NOWCAST

SATLUJ: Light to Moderate rainfall likely to Continue
 BEAS: Light to Moderate rainfall likely to Continue with possibility of heavy rainfall in the catchment

STATE NOWCAST

Light to moderate rainfall with thunder with Heavy to very Heavy Rainfall at isolated places in the districts of CHAMBA(Dainouze, Sphita, Bhaui, Bhatiyar, Hoi, Bharnaur and Chamba), KANGRA(Javah, Shalgar, Kangra, Dharamshala, Baroh, Dhir, Falampur, Khundani, Dhural, Batnath and Jasinagar), UNA(Haroli, Una and Bangana), BILASPUR(Ghumarwin, Bilaspur, Jhandutta and Nainadevi), SOLAN(Nalagarh, Ramshahar, Arki and Kandaghat), SIRMAUR(Ponta, Dadahu, Nahan, Remuka, Kanara and Pachhad) SHIMLA(Chawal, Cheta, Nerua, Sunni, Shimla, Rampur, Chirgaon, DodraKovar and Theog), HAMIRPUR and MANDI.

Light to Moderate Rainfall in Remaining Districts

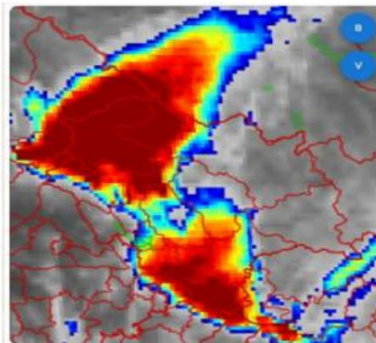
WARNING CODES

NO WARNING BE UPDATED BE PREPARED TAKE ACTION

Impact Expected
 Possibility of landslide.
 Poor visibility conditions likely to prevail

Advisors
 Drive cautiously.

Phone: 0177-2624976, 2920976 E-mail: metcentrsm@gmail.com Website: mausam.imd.gov.in/shimla



Moderate to heavy rainfall at many places very likely to continue over the state with very heavy to extremely heavy rainfall at isolated places in the district of Chamba Kangra Hamirpur Mandi Bilaspur Solan Shimla Kullu and Sirmaur

Very Heavy rainfall at many places and extremely heavy rainfall at isolated places in Beas, Ranjit sagar and pong dam catchment area
 Heavy rainfall at many places with very heavy rainfall at isolated places in Sutlej catchment area

Extremely Heavy Rain Alert

Issued By IMD Shimla

08 Jul, 13:30



Highest
Intensity



Himachal Pradesh



09 Jul, 13:30

Heavy to very heavy Rainfall is most likely to occur over Himachal Pradesh with Extremely Heavy Rain at isolated places in the districts of Bilaspur, Chamba, Hamirpur, Kangra, Kullu and Mandi during the next 24 to 48 hours.



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Map



Listen



Translate



Dos &
Don'ts

Very Heavy Rain Alert

Issued By IMD Shimla

10 Jul, 08:30



Highest
Intensity



HIMACHAL PRADESH



10 Jul, 11:30

कांगड़ा, कुल्लू, मंडी, शिमला, सिरमौर, ऊना, बिलासपुर, सोलन, हमीरपुर जिलों में अधिकांश स्थानों पर मध्यम से भारी वर्षा, गरज और एक दो स्थानों पर अत्यधिक भारी वर्षा, गरज होने की संभावना है।



Share



Map



Listen



Translate



Dos &
Don'ts



"जरूरी सूचना"

07 जुलाई, 2023



भारत मौसम विज्ञान केंद्र, शिमला द्वारा जारी मौसम पूर्वानुमान के अनुसार दिनांक 07 से 10 जुलाई 2023 तक हिमाचल प्रदेश में अलग-अलग स्थानों पर भारी बारिश की चेतावनी (Yellow Alert) जारी की गयी है। उक्त चेतावनी को मद्देनज़र रखते हुए :-

- बारिश, हिमस्खलन एवं भूस्खलन संभावित क्षेत्रों में तथा ऊपरी/पहाड़ी भागों में जाने से परहेज़ रखें।
- ख़राब मौसम में Trekking करना तथा ऊंचाई वाले क्षेत्रों में जाना खतरनाक हो सकता है।
- विजली चमकने की सुरत में कम से कम 30 मिनट तक घरों या सुरक्षित इमारतों के अंदर ही रहना चाहिए।
- नदी - नालों में न जायें, क्योंकि बरसात में अचानक जलस्तर बढ़ने का खतरा रहता है।
- मौसम विभाग द्वारा जारी चेतावनी पर ध्यान दें तथा Radio/Television पर मौसम बारे प्रसारित बुलेटिन को सुनें।
- ग्राम पंचायत प्रधानों, उप प्रधानों, गैर-सरकारी संगठनों, ट्रैक्स एवं पैदल यात्रियों से अनुरोध है कि वह इस सन्देश को अधिक से अधिक लोगों तक पहुंचाएं।

"राष्ट्रीय आपदा प्रबंधन प्राधिकरण ने Sachet Mobile APP(<http://bit.ly/3Fb3Osz>) को बनाया है। यह App मौसम व अन्य आपदाओं की सटीक जानकारी मोबाइल पर भेजता है, जिससे समय पर भारी वर्षा, आंधी तूफान और अवधाव इत्यादि के बारे में सूचना मिलती है।"



राज्य आपदा प्रबंधन प्राधिकरण, हिमाचल प्रदेश
सरकार द्वारा जनहित में जारी।

किसी भी आपदाकाल की स्थिति में
राज्य आपदा प्रबंधन प्राधिकरण, शिमला के इन नम्बरों पर सूचित करें :-

0177-2629688, 2629439, 2629939/2628940 Toll Free-1070/1077
Email: seocshimla@gmail.com, sdma-hp@nic.in
Website: www.hpsdma.nic.in



"जरूरी सूचना"

08 जुलाई, 2023



भारत मौसम विज्ञान केंद्र, शिमला द्वारा जारी मौसम पूर्वानुमान के अनुसार दिनांक 08 से 09 जुलाई 2023 तक हिमाचल प्रदेश के जिला चम्बा, कुल्लू, कांगड़ा, मंडी, ऊना, बिलासपुर में और समीपवाले स्थानों पर भारी बारिश की चेतावनी (Orange Alert) जारी की गयी है। उक्त चेतावनी को मद्देनज़र रखते हुए :-

- बारिश, हिमस्खलन एवं भूस्खलन संभावित क्षेत्रों में तथा ऊपरी/पहाड़ी भागों में जाने से परहेज़ रखें।
- ख़राब मौसम में Trekking करना तथा ऊंचाई वाले क्षेत्रों में जाना खतरनाक हो सकता है।
- विजली चमकने की सुरत में कम से कम 30 मिनट तक घरों या सुरक्षित इमारतों के अंदर ही रहना चाहिए।
- नदी - नालों में न जायें, क्योंकि बरसात में अचानक जलस्तर बढ़ने का खतरा रहता है।
- मौसम विभाग द्वारा जारी चेतावनी पर ध्यान दें तथा Radio/Television पर मौसम बारे प्रसारित बुलेटिन को सुनें।
- ग्राम पंचायत प्रधानों, उप प्रधानों, गैर-सरकारी संगठनों, ट्रैक्स एवं पैदल यात्रियों से अनुरोध है कि वह इस सन्देश को अधिक से अधिक लोगों तक पहुंचाएं।

"राष्ट्रीय आपदा प्रबंधन प्राधिकरण ने Sachet Mobile APP(<http://bit.ly/3Fb3Osz>) को बनाया है। यह App मौसम व अन्य आपदाओं की सटीक जानकारी मोबाइल पर भेजता है, जिससे समय पर भारी वर्षा, आंधी तूफान और अवधाव इत्यादि के बारे में सूचना मिलती है।"



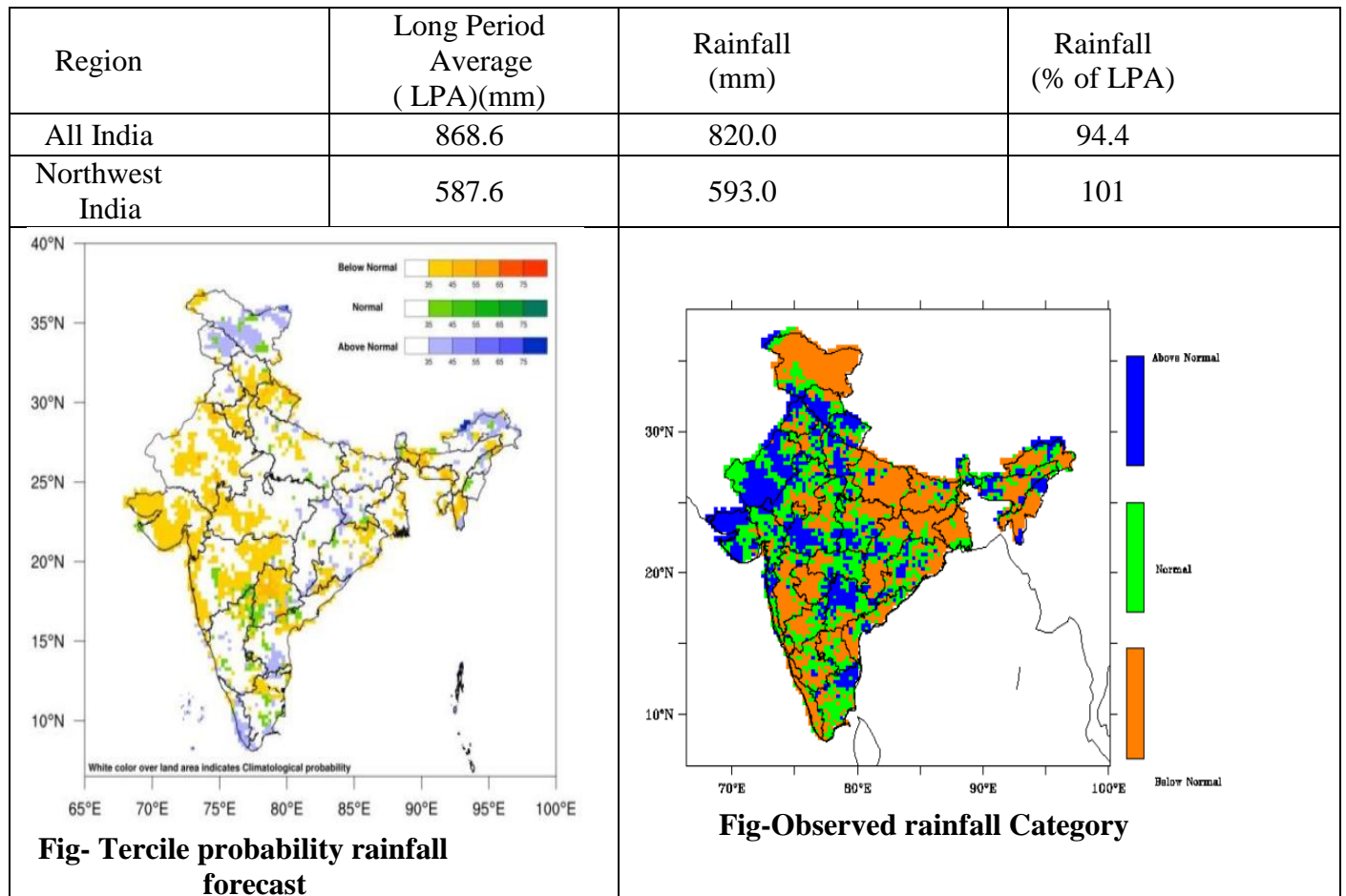
राज्य आपदा प्रबंधन प्राधिकरण, हिमाचल प्रदेश
सरकार द्वारा जनहित में जारी।

किसी भी आपदाकाल की स्थिति में
राज्य आपदा प्रबंधन प्राधिकरण, शिमला के इन नम्बरों पर सूचित करें :-

0177-2629688, 2629439, 2629939, 2628940 Toll Free-1070/1077
Email: seocshimla@gmail.com, sdma-hp@nic.in
Website: www.hpsdma.nic.in

9. Verification of LRF:-

Seasonal rainfalls over Northwest India, Central India, South Peninsula and Northeast (NE) India were 101%, 100%, 92% and 82% of respective LPA. The forecasts for the rainfall over the country as whole during the season as a whole could be predicted well as the realized rainfall is 94% of LPA against the forecast of $96\% \pm 4\%$.



9.1 Rainfall in Northwest India rainfall :-

June	147% (Above rainfall)
July	125% (Above rainfall)
August	47% (Deficient rainfall)
September	75% (Below Normal)

10. Dissemination of extreme weather:-

Extreme weather events, Flash flood information, quick weather messages were forwarded in our weather groups, district disaster groups. All the information were uploaded in official website and official account of our social media groups like whatsapp, Instagram, twitter, facebook.

The image shows two Facebook posts. The top post is from the Himachal Pradesh State Disaster Management Authority, featuring a video of the Pandoh Dam with a blue overlay that reads: "ALERT Pandoh Dam reservoir is full. Dam gates have been opened. Downstream areas including Mandi to be alert. Stay away from the banks of river Beas". Below this is a post from Himachal Pradesh Police with the text: "Alert Pandoh Dam reservoir is full. Dam gates have been opened. Downstream areas including Mandi to be alert. Stay away from the banks of river Beas". The bottom post is also from the Himachal Pradesh State Disaster Management Authority, showing photos of a landslide on a road and a caption: "Situation of Mandi Pandoh road at 9:30 am today. All citizens are advised to remain vigilant and avoid unnecessary travel." Below this is another post from Himachal Pradesh Police: "Mandi Pandoh Road Condition at 9:30 am today. All citizens are advised to be vigilant and not to travel unnecessary. Situation of Mandi Pandoh road at 9:30 am ... See more".

The image contains two parts. The top part is a poster titled "SDMA/DDMA OUTREACH" for "हिमाचल प्रदेश मौसम अपडेट" (Himachal Pradesh Weather Update) dated 10 July, 2023. It features a color-coded map of Himachal Pradesh and lists weather alerts: "ALERT" for rain, "सावधानियाँ" (Precautions) for heavy rain, and "आपातकालीन स्थिति में" (In emergency situations) with contact numbers 112 ERSS and 1070/1077. The bottom part is a WhatsApp chat from "Team Kangra" (HPS, Kangra, Robin, Rohit, SAURAB...) showing a message from Robin at 5:32 PM: "As per the information received from pardhan Bada bangal, one public toile washed away and school is also on risk due to heavy rainfall." Below the chat is a screenshot of a "Heavy Rainfall Alert" from NDM India, issued by IMD Shriya on 09 Jul, 17:30, with a highest intensity of 10 Jm, 17:30. The alert text in Hindi states: "अगले 24 घंटों में राज्य के अधिकांश स्थानों पर गरज के साथ मध्यम से भारी वर्षा, कुछ स्थानों पर बहुत भारी वर्षा तथा एक दो स्थानों पर अत्यधिक भारी वर्षा होने की सम्भावना है।" (There is a possibility of medium to heavy rain with thunder in most parts of the state in the next 24 hours, very heavy rain in some places and extremely heavy rain in one or two places).

11. Impact in Himachal Pradesh during Monsoon Season:-

Heavy to Extremely heavy rainfall spells occurred during monsoon resulted in widespread damage to public and private properties via overflowing of major rivers, blockage of roads, landslides, flashfloods, damage to bridges, complete disruptions of electrical and communication system, including loss of human lives.



Heavy rain triggers landslides, blocking roads in Himachal

Heavy rain in Himachal Pradesh in the past 24 hours triggered landslides and uprooted trees, damaging houses and vehicles and blocking 150 roads. In a rain-related incident on Sunday, a conductor of a private bus was injured when a tree got uprooted and fell on the vehicle near ISBT here, officials said. A total of 452 roads, including a maximum of 236 in Mandi, 59 in Shimla and 40 in Bilaspur district are now closed for vehicular traffic, according to the emergency operation centre. A large number of heavy vehicles got stranded on the Shimla-Kalka highway due to continuous landslides. 711



Shimla Airport road blocked at various RD Machinery deployed for removal of slips

9:21 AM



Tofu bus stand



Road damage at Rd 14/00-14/030 on NH 05 at mahali road single lane due to damage of outer road edge due to sliding

11:39 AM

12. Conclusion:-

Timely forecast and warning issued during monsoon season with continuous communication with DDMA and state authority during extreme weather led to significant lessening the loss and damage as much as possible.

13. Legends:-

Note: Forecast/Warning for any day is valid from 0830 hours IST of that day till 0830 hours IST of next day

WARNING	PROBABILISTIC FORECAST		SPATIAL		RAINFALL INTENSITY	
WARNING(TAKE ACTION)	Terms	Probability of Occurrence	DRY	No Rainfall	Light	2.5-15.5 mm
ALERT (BE PREPARED)	Unlikely	<25%	ISOLATED	1-25%	Moderate	15.6-64.4 mm
WATCH (BE UPDATED)	Likely	25-50%	FEW	26-50%	Heavy	64.5-115.5 mm
NO WARNING (NO ACTION)	Very Likely	50-75%	MANY	51-75%	Very Heavy	115.6-204.4 mm
	Most Likely	>75%	MOST	76-100%	Extremely Heavy	≥204.5 mm

For latest Weather Bulletin and warnings

kindly visit following links

Website:<https://mausam.imd.gov.in/shimla/>

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