

DISASTER RISK REDUCTION : KEDARNATH CASE

**Anand Sharma, RMC, IMD,
New Delhi**

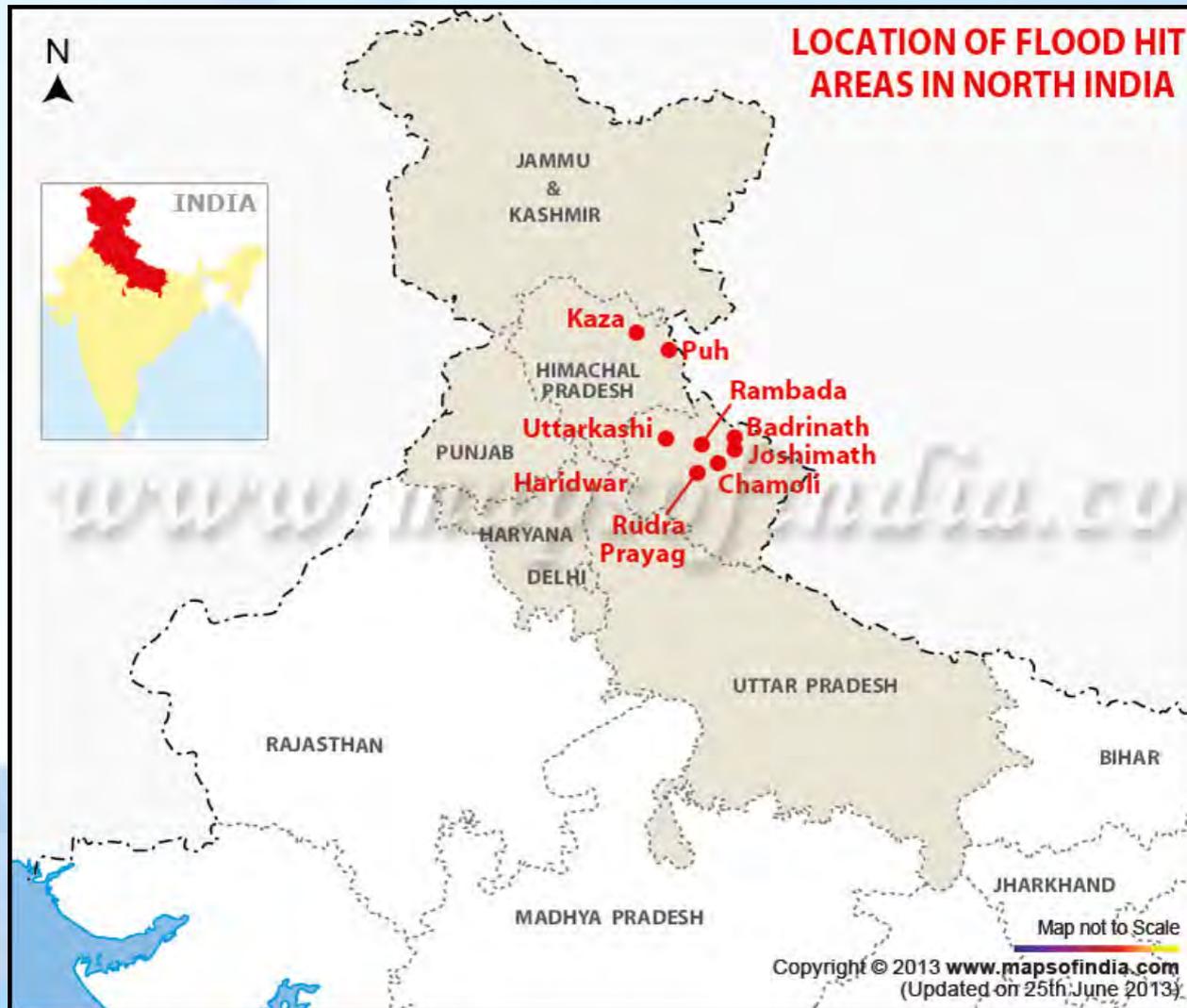


WHAT HAPPENED ?

- ❖ GEOGRAPHIC LOCATION
- ❖ LOSSES
- ❖ WEATHER DETAILS



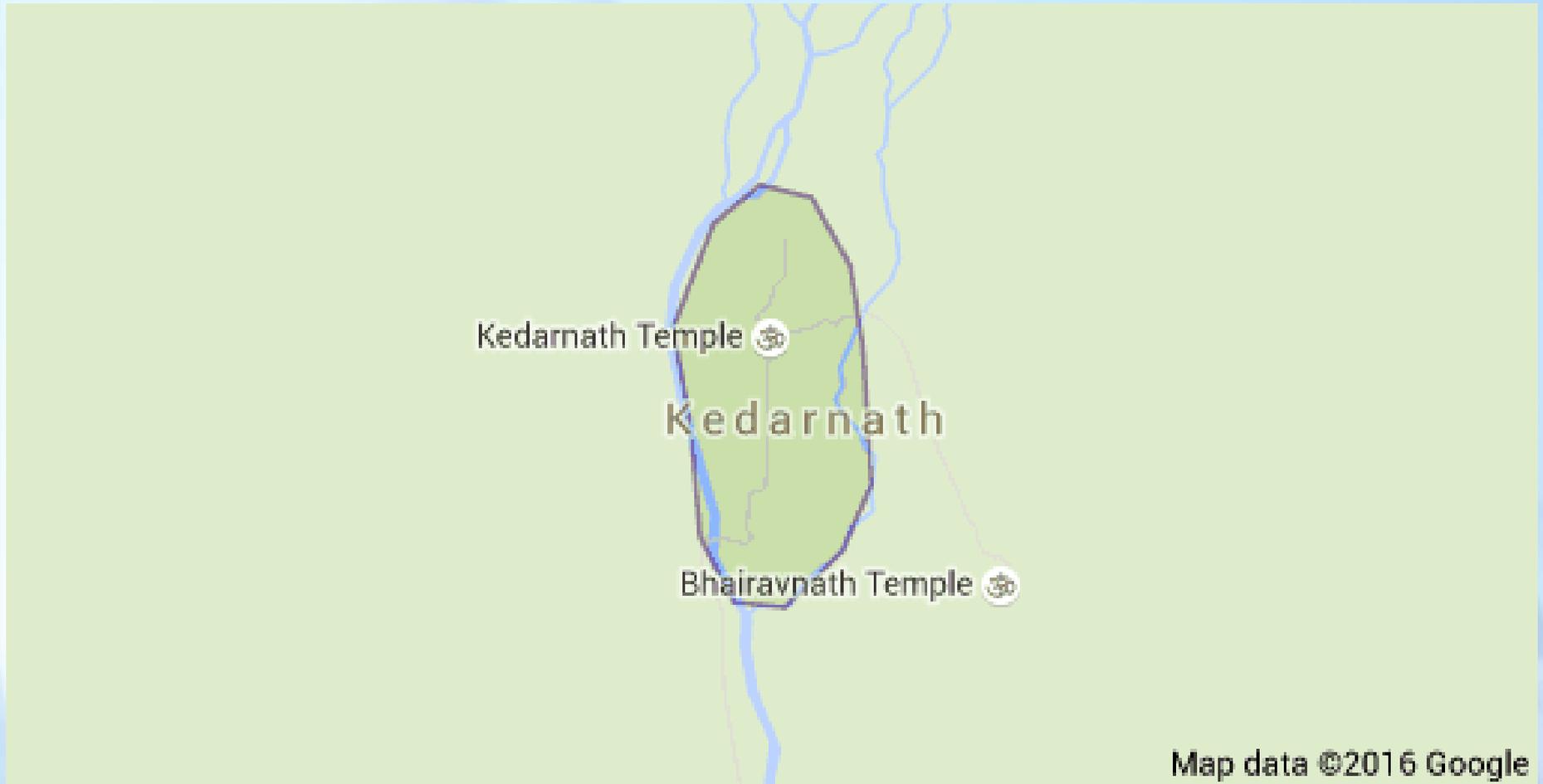
GEOGRAPHIC LOCATION



GEOGRAPHIC LOCATION



GEOGRAPHIC LOCATION



Rainfall During the Event

RAINFALL DATA JUNE 2013					
DATE	14	15	16	17	18
DISTRICT: ALMORA					
ALMORA	15.1	1.0	32.4	89.3	100.0
RANIKHET (G)	4.0	0.0	16.0	38.0	120.0
DISTRICT: BAGESHWAR					
BAGESHWAR (THMO)	15.0	3.0	61.0	161.0	63.0
KOSANI (U PROB)	43.2	20.2	105.0	205.0	83.2
DISTRICT: CHAMOLI					
CHAMOLI	1.0	37.0	58.0	76.0	100.0
JOSHIMATH	0.0	31.4	41.9	113.8	78.6
KARNAPRAYAG	8.2	7.0	88.0	89.6	82.3
THARALI	0.0	15.0	58.0	173.0	80.0
DISTRICT: CHAMPAWAT					
BAMBASA	0.0	0.0	3.0	99.0	230.0
CHAMPAWAT	0.0	1.0	34.0	97.0	222.0
DISTRICT: DEHRADUN					
DEHRA DUN	93.4	53.5	219.9	370.2	11.8
MUSSOORIE	16.0	44.0	137.0	155.0	8.0
DISTRICT: GARHWAL PAURI					
KOTDWARA	0.0	9.0	73.0	23.0	52.2
LANDSDOWN	16.0	0.0	64.0	51.0	28.0
PAURI	0.0	0.0	44.0	51.0	38.0
DISTRICT: GARHWAL TEHRI					
DEOPRAYAG	0.5	7.3	129.5	163.3	69.5
KEERTINAGAR	0.0	0.0	78.0	96.0	65.2
TEHRI	3.7	33.5	121.9	168.9	53.4
TEHRI (CWC)	0.2	0.0	124.0	168.4	17.6
DISTRICT: HARDWAR					
HARDWAR	10.0	20.0	107.6	218.0	14.0
ROORKEE	0.0	5.0	51.0	147.0	15.0
DISTRICT: NAINITAL					
HALDWANI	0.0	13.0	91.0	200.0	278.3
MUKTESHWAR	14.0	0.4	78.4	236.8	183.0
NAINITAL	14.8	18.6	43.6	175.6	170.2
DISTRICT: PITHORAGARH					
MUNSIYARI	4.0	25.0	44.0	85.0	75.0
PITHORAGARH	0.0	0.0	11.2	85.5	117.2
DISTRICT: RUDRAPRAYAG					
JAKHOLI	25.0	71.0	121.0	108.0	65.0
RUDRAPRAYAG	4.0	11.8	89.4	92.2	59.2
DISTRICT: UDHAM SINGH NAGAR					
KASHIPUR	0.0	65.0	2.0	31.0	35.0
PANTNAGAR	0.0	0.0	5.6	62.1	113.0
DISTRICT: UTTARKASHI					
BARKOT	10.0	15.4	112.6	20.0	20.0
BHATWARI	20.0	18.0	35.0	70.0	50.0
DUNDA	5.0	80.0	118.0	185.0	16.0
PUROLA	26.0	36.0	165.0	60.0	104.0
UTTAR KASHI	15.0	35.0	129.0	162.0	19.0
UTTAR KASHI (CWC)	4.2	48.2	121.8	207.4	21.2

HOW WE ACTED?

❖ WEATHER FORECAST

❖ ACTIONS / INNOVATIVE ADVISORIES



Advisories issued by IMD office at Dehradun

Char dham yatra forecast issued on 15-06-13 (morning): Char Dham yatris are advised to postpone yatra by four days.

Char dham yatra forecast issued on 16-06-13 (morning): Char Dham yatris are advised to postpone yatra by three days.

Advisory (issued on 15-06-13) to DM and SP RUDRAPRAYAG and ITBP: Yatris are requested to get back to safer places.

Advisory (issued on 16-06-13) to Chief Secretary , Secretary , Disaster management , Executive director , Disaster management , DM's of respective districts and ITBP :

People are advised to move to safer places and not to venture into hills with warning of landslides as well.



STATION	DATE	FORECAST/WARNING ISSUED BY METEOROLOGICAL CENTRE, DEHRADUN FOR CHAR DHAM YATRA ISSUED ON 15-06-13
JOSHIMATH	15-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
BADRINATH	15-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
KEDARNATH	15-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
YAMNOTRI	15-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
GANGOTRI	15-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.

Warning/alert: Possibility of rather heavy to heavy rainfall at isolated places in Uttarakhand during next 72 hours. Possibility of heavy to very heavy rainfall at isolated places on 17.06.2013.

Outlook for subsequent two days: No large change.

Chardham yatris are advised to postpone yatra by four days.



STATION	DATE	FORECAST/WARNING ISSUED BY METEOROLOGICAL CENTRE, DEHRADUN FOR CHAR DHAM YATRA ISSUED ON 16-06-13
JOSHIMATH	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	18-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
BADRINATH	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	18-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
KEDARNATH	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	18-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
YAMNOTRI	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	18-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.
GANGOTRI	16-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	17-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of heavy to very heavy rain in some areas.
	18-06-13	Cloudy sky. Rain/thunder shower would occur. Possibility of rather heavy to heavy rain in some areas.

Warning/alert: Possibility of heavy to very heavy rainfall at isolated places in Uttarakhand during next 72 hours.

Outlook for subsequent two days: No large change.

Chardham yatris are advised to postpone yatra by three days.



Weather forecast for higher reaches Kedarnath and Badrinath and surrounding areas issued on 13-06-13 (valid for next 72 hours)

- ❖ Anand Sharma <anand.sharma870@gmail.com>
- ❖ Jun 13
- ❖ to Dm, Barinderjit, DM
- ❖ Dear Sir,
- ❖ Weather forecast for higher reaches Kedarnath and Badrinath and surrounding areas issued on 13-06-13 (valid for next 72 hours):
- ❖ Generally cloudy sky with possibility of moderate rain / thunder showers in some areas on 13-06-13 , 14-06-13 and 15-06-13 .
- ❖ Advisory : Yatris are requested to carry rain coat, umbrella, woolens & jackets .
- ❖ WARNING / ALERT : Rather heavy rain likely at isolated places along the char dham yatra. Possibility of landslides.
- ❖ Outlook for next 48 hours(16-06-13 to 17-06-13:
- ❖ Increase in rainfall with isolated heavy falls.



from: Anand Sharma <anand.sharma870@gmail.com>
to: Dm Rudraprayag <dmrudraprayag@gmail.com>, Barinderjit Singh <baris.iitk@gmail.com>, DM RP <dm-rud-ua@nic.in>
date: Sat, Jun 15, 2013 at 7:21 AM
subject: Weather forecast for higher reaches Kedarnath and Badrinath and surrounding areas issued on 15-06-13
mailed-by: gmail.com

Dear Sir,

Weather forecast for higher reaches Kedarnath and Badrinath and surrounding areas issued on 15-06-13 (valid for next 72 hours):

Cloudy to overcast sky with moderate to rather heavy rain / thunder showers in some areas on 15-06-13 , 16-06-13 and 17-06-13 .

Advisory : Yatris are requested to get back to safer places .

WARNING / ALERT : Heavy rain likely during next 72 hours with very heavy falls on 17-06-13.

Outlook for next 48 hours(18-06-13 to 19-08-13):

Decrease in rainfall.

with best regards



from: Director , Meteorological Centre, Dehradun

Anand Sharma <anand.sharma870@gmail.com>

To

Dm Rudraprayag <dmrudraprayag@gmail.com> ,

Barinderjit Singh <baris.iitk@gmail.com>

date:

Sun, Jun 16, 2013 at 11:47 AM

subject:

WARNING / ALERT : Heavy rain likely during next 36 hours with very heavy falls at isolated places.

mailed-by:

gmail.com

Dear Sir,

Weather forecast for higher reaches Kedarnath and Badrinath__and surrounding areas issued on 16-06-13 (valid for next 72 hours):

Cloudy to overcast sky with moderate to rather heavy rain / thunder showers in some areas on 16-06-13 , 17-06-13 and 18-06-13 with isolated heavy to very falls on 16-06-13 and 17-06-13 .

Advisory : Yatris are requested to get back to safer places .

WARNING / ALERT : Heavy rain likely during next 36 hours with very heavy falls at isolated places.

Outlook for next 48 hours(19-06-13 to 20-08-13):

Rainfall likely to decrease.

with best regards



From Anand Sharma <anand.sharma870@gmail.com>

To: UK <cs-uttaranchal@nic.in>,
mo sfd <mosafdarjung@gmail.com>,
"secy-disasmgmt-ua@nic.in" <secy-disasmgmt-ua@nic.in>,
dmmc dehradun <seoc.dmmc@gmail.com>,
dir mcddn <anand.sharma870@gmail.com>

date: Sun, Jun 16, 2013 at 1:41 PM

subject: warning

mailed-by: gmail.com

Dear Sir,

**Widespread rain across the state with Heavy to very heavy Rain /
thundershower likely at few places during next 36 hours.**

**Warning : heavy to very heavy rain with possibility of landslides during next 36
hours.**

**Advisory : people are advised to move to safer places and not to venture
into hills.**

with best regards

Anand Sharma

Director , Meteorological Centre, Dehra Dun





इस अलाम अलाह की बुनियाद... वाचों में फैलाता राजमेसी... नमस्कार के साथ मराठों का स्वागत...

कनक यात्रा नमक कम। विद्या के कुछ ज्ञान और कुछ अनजाने अंजान...



आमर उजाला

पंजाबी | उर्दू | हिन्दी | अंग्रेजी | फारसी | सिंधी | गुजराती | तमिल | कन्नड़ | मराठी

महंगा हुआ पेट्रोल

₹2

बड़ी दिल्ली (एनटी): भारत के मुद्रास्तर बढ़ने से दिल्ली में पेट्रोल के अभाव का खतरा उत्पन्न हो चुका है। दिल्ली में पेट्रोल के अभाव का खतरा उत्पन्न हो चुका है। दिल्ली में पेट्रोल के अभाव का खतरा उत्पन्न हो चुका है।

भारी बारिश, भूस्खलन की चेतावनी, पहाड़ की यात्रा टालने की सलाह आ गया मानसून प्रदेश में पसरते जा रहे हैं डेंजर जोन

अंतर उजवाला

दिल्ली (एनटी): भारत के मुद्रास्तर बढ़ने से दिल्ली में पेट्रोल के अभाव का खतरा उत्पन्न हो चुका है। दिल्ली में पेट्रोल के अभाव का खतरा उत्पन्न हो चुका है। दिल्ली में पेट्रोल के अभाव का खतरा उत्पन्न हो चुका है।

मानसून 12 साल पहले भी एक पल्लावादा पूर्व पहुंचा था

दिल्ली (एनटी): मानसून के आगमन के साथ ही देश में भारी बारिश शुरू हो गई है। मानसून के आगमन के साथ ही देश में भारी बारिश शुरू हो गई है। मानसून के आगमन के साथ ही देश में भारी बारिश शुरू हो गई है।



भूस्खलन के लिए संवेदनशील गांवों की संख्या 450 हुई

दिल्ली (एनटी): मानसून के आगमन के साथ ही देश में भारी बारिश शुरू हो गई है। मानसून के आगमन के साथ ही देश में भारी बारिश शुरू हो गई है। मानसून के आगमन के साथ ही देश में भारी बारिश शुरू हो गई है।

महंगा हुआ पेट्रोल

पेट्रोल	₹/लीटर
पेट्रोल	84.32
डीजल	68.35
डीजल	55.79
डीजल	71.29
डीजल	74.68
डीजल	74.59

48 गंगोत्री हाईवे पर बेहाल हुए तीर्थयात्री

दिल्ली (एनटी): गंगोत्री हाईवे पर बेहाल हुए तीर्थयात्री। गंगोत्री हाईवे पर बेहाल हुए तीर्थयात्री। गंगोत्री हाईवे पर बेहाल हुए तीर्थयात्री।

12 घंटे तक के लिए अट्टा जारि

दिल्ली (एनटी): अट्टा जारि के लिए 12 घंटे तक के लिए अट्टा जारि। अट्टा जारि के लिए 12 घंटे तक के लिए अट्टा जारि।



2010 में विस्थापन के लिए बचनित गांवों की संख्या

दिल्ली (एनटी): 2010 में विस्थापन के लिए बचनित गांवों की संख्या। 2010 में विस्थापन के लिए बचनित गांवों की संख्या।

आज टूटनेवाली भाजपा जटायू की दोस्ती

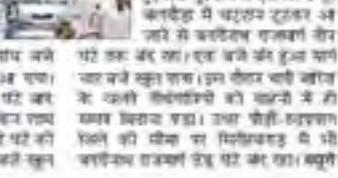
दिल्ली (एनटी): आज टूटनेवाली भाजपा जटायू की दोस्ती। आज टूटनेवाली भाजपा जटायू की दोस्ती।

12 घंटे तक के लिए अट्टा जारि

दिल्ली (एनटी): अट्टा जारि के लिए 12 घंटे तक के लिए अट्टा जारि। अट्टा जारि के लिए 12 घंटे तक के लिए अट्टा जारि।

48 गंगोत्री हाईवे पर बेहाल हुए तीर्थयात्री

दिल्ली (एनटी): गंगोत्री हाईवे पर बेहाल हुए तीर्थयात्री। गंगोत्री हाईवे पर बेहाल हुए तीर्थयात्री।



2013 में विस्थापन के लिए बुले जार गांव

दिल्ली (एनटी): 2013 में विस्थापन के लिए बुले जार गांव। 2013 में विस्थापन के लिए बुले जार गांव।

तत्काल टिकटों के गोरखधंधे की जड़ें मुंबई में चुनाबी मोड में आई

रेल का खुला खेल : टिकटों की धांधली का सच, उत्तर की टिकटें हो रही पश्चिम से बुक

दिल्ली (एनटी): रेल का खुला खेल : टिकटों की धांधली का सच, उत्तर की टिकटें हो रही पश्चिम से बुक। रेल का खुला खेल : टिकटों की धांधली का सच, उत्तर की टिकटें हो रही पश्चिम से बुक।

वर्मिघम में भारत सिंघम



वर्मिघम में भारत सिंघम। वर्मिघम में भारत सिंघम। वर्मिघम में भारत सिंघम।

अंतर बॉट

165	राज्य का राज
102	राज्य का राज
04	राज्य का राज
22	राज्य का राज

बहुगुणा सरकार

दिल्ली (एनटी): बहुगुणा सरकार। बहुगुणा सरकार। बहुगुणा सरकार।



बाढ़ से बचने के लिए नदियों से दूर रहना जरूरी

हमारे सामने दो ही रास्ते हैं। या तो हिमालय को छोड़ कर चले जाएं या फिर यहां की आपदाओं से निपटने का तरीका सीखें। पहला रास्ता अपनाना तो मुमकिन नहीं तो फिर आज ही सबक लेना होगा। हम नदियों नालों में बिल्डिंग बना रहे हैं तो फिर बाढ़ को कैसे रोकेंगे। देहरादून में ही देखिए - विधानसभा नदी में बना दी गयी, यूनिवर्सिटी नदी में बना दी गयी, हजारों लोगों के नदी के रास्ते में बसा दिया गया। पॉलीथिन से हमने सारे नाले चोक कर रखे हैं। देहरादून में एक दिन में 487 मिमी बारिश होने का अधिकतम रिकार्ड है,

अगर इतनी बारिश अब हो गयी तो आघा दून जाएगा। रही बात दुर्गम पहाड़ी क्षेत्र की तो वह पहले आपदा की चेतावनी पहुंचाने के इंतजाम होंगे। तभी हम प्राकृतिक आपदा के नुकसान कर सकते हैं। मौसम विभाग और सरकार ने से पूर्व चेतावनी देने का प्रयास शुरू किया है। इसे गांव गांव तक पहुंचाने का प्रयास करना

डॉ. आ
मौसम केंद्र निदेश

HOW WE CAN MAKE IT BETTER

- ❖ **Failsafe communication (Tone alert Hand winding FM community Radio)**
- ❖ **Better planning of Land Use**
- ❖ **Building awareness about extreme weather and climate events**
- ❖ **Better institutional linkages (joint interpretation of risks associated with extreme weather events**



Thank You



भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

