

Government of Nepal Ministry of Energy, Water Resource and Irrigation Department of Hydrology and Meteorology

Babarmahal, Kathmandu

Date: 08 October 2024

Situational Report on Extreme Precipitation and Flooding Event of 27-29 September 2024

1. Background

Monsoon became active at the end of September and brought very heavy to extremely heavy precipitation across the country. Persistent rainfall caused extensive damage and disruption impacting various sectors. Heavy rainfall caused landslides, flooding, inundation and road closures, significantly affecting daily life, transportation, and overall safety. 25 stations of 14 districts (Kathmandu, Lalitpur, Bhaktapur, Kavrepalanchowk, Argakhanchi, Chitwan, Dhading, Jhapa, Makwanpur, Nuwakot, Palpa, Panchthar, Sindhupalchowk, Tanahun) made the new record of extreme 24 hour precipitation on 28 September. Daman recorded the highest three-day accumulated precipitation of 517.0 mm.

The floods induced from the heavy precipitation significantly affected river basins, particularly the Bagmati, Narayani, and Koshi basins. Rivers such as Bagmati, Narayani, and Sunkoshi and their tributaries swelled beyond their historic flood levels, leading to catastrophic flooding in several areas resulting in more than 200 deaths, dozens still missing as floodwaters swept away homes and entire villages. Localized flash floods and landslides damaged homes, public infrastructure, and agricultural land.

2. Preliminary Synoptic Analysis

A deep cyclonic circulation, extended up to mid-tropospheric level and with north-south elongated trough, was located over the northern part of Madhya Maharashtra region (India) on 27 September (Figure 1a). This system moved northward (towards Nepal) over the southwest Madhya Pradesh region (India) on 28 September. A westerly trough in the mid-troposphere (500 hPa) persisted from 27 to 28 September (Figure 1d-1e) supported in intensifying the circulation storm system. Preliminary analysis shows this elongated trough from northeast Arabian Sea to northwest Bihar, supported by mid-tropospheric westerly trough induced favorable conditions for the sufficient moisture supply from Arabian sea and Bay of Bengal to Nepal causing the widespread precipitation throughout the country on 27 and 28 September. On 29 September, this cyclonic circulation located over the southwest Uttar Pradesh (Figure 1c) and mid-tropospheric westerly trough (Figure 1f) became weak.



Figure 1: Preliminary Surface and Upper air chart (27 September-29 September, 2024)

3. Observed Precipitation

The three-day accumulated precipitation from 26 September 08:45 AM to 29 September 08:45 AM shows heavy to extremely heavy rainfall in Koshi Province, Madhesh Province, Bagmati Province, the southern part of Gandaki Province, and the eastern part of Lumbini Province while light to moderate precipitation was recorded across rest of the country (Figure 2). Meteorological stations at Daman, Chandragadhi, Dedhgaun, Naikap, Kechana, and Khopasi reported accumulated precipitation over 400 mm for the period. A total of 183 stations recorded more than 50 mm of precipitation (Table 1). On 28 September, 25 stations from 14 districts, including 11 stations within the Kathmandu Valley, set new extreme 24-hour precipitation records (Table 2). 16 of these record breaking stations were located within a small area of approximately 1000 square kilometers.



Figure 2: Three-day accumulated precipitation measured at 8:45 AM on 29 September 2024

Table 1: Number of Stations based on three-day accumulated precipitation amount

Precipitation range (mm)	No. of stations
50 mm – 100 mm	24
100 mm – 200 mm	54
200 mm – 300 mm	68
300 mm – 400 mm	31
400 mm – 500 mm	5
More than 500 mm	1

S.	Station Name	District	Precipitation	Previous	Date of
IN.			(mm) recorded	record (mm)	previous
			(8:45 AM)	(mm)	record
1	Sandhikharka	Arghakhanchi	196.6	166.0	16-Jun-2021
2	Nangkhel	Bhaktapur	194.5	191.5	23-Jul-2002
3	Govindabasti	Chitwan	264.0	196.0	19-Jul-2024
4	Gajuri	Dhading	261.2	131.3	2-Jul-2021
5	Chandragadi Airport	Jhapa	256.0	188.2	28-Jun-2022
6	Panipokhari	Kathmandu	206.6	198.0	14-Jun-1971
7	Kathmandu Airport	Kathmandu	239.7	177.0	23-Jul-2002
8	Buddhanilakantha	Kathmandu	178.3	159.0	23-Jul-2002
9	Jitpurphedhi	Kathmandu	178.3	128.2	7-Jul-2019
10	Nagarjun	Kathmandu	205.4	147.5	13-Sep-2014
11	Khopasi(Panauti)	Kavrepalanchok	331.6	276.9	3-Sep-2015
12	Panchkhal	Kavrepalanchok	232.5	145.0	21-Oct-1999
13	Dhulikhel	Kavrepalanchok	224.6	220.0	23-Jul-2002
14	Godavari	Lalitpur	311.6	225.2	23-Jul-2002
15	Khumaltar	Lalitpur	294.4	136.0	10-Aug-2022
16	Tikathali	Lalitpur	264.0	207.0	23-Jul-2002
17	Khokana	Lalitpur	297.3	249.2	23-Jul-2002
18	Chapagaun	Lalitpur	323.5	200.5	23-Jul-2002
19	Daman	Makwanpur	410.0	373.2	20-Jul-1993
20	Kakani	Nuwakot	169.2	161.0	28-Jul-1972
21	Baldyanggadi	Palpa	252.0	90.4	16-Sep-2012
22	Phidim	Panchthar	172.0	148.9	20-Oct-2021
23	Baunepati	Sindhupalchok	190.6	137.5	16-Jul-1978
24	Sakhar at Tanahun	Tanahun	214.0	173.2	21-Jul-2020
25	Khairini Tar	Tanahun	252.3	241.9	17-Jul-1983

Table 2: Record breaking precipitation stations (24-hour accumulated) on 28 September, 2024at 8:45 A.M.

4. Rainfall forecast and verification

The monsoon special bulletin was issued on 23 September (Annex 2) and was updated on 25 September for the period of 26 to 29 September 2024 (Annex 3) based on the numerical prediction model (Annex 1) of DHM as well as on various global models from regional and international centers. In the bulletin, heavy to very heavy precipitation was predicted at most places of Koshi Province, Bagamati province, Gandaki Province and Lumbini Province and few places at Madhesh

Province, Karnali Province and Sudurpaschim Province. Extremely heavy precipitation was expected at a few places of Gandaki Province and Lumbini Province and one or two places of Koshi Province, Bagmati Province, Madhesh Province and Sudurpaschim Province. The bulletin further categorized the risk as "Take Action" for 56 districts, "Be Prepared" for 19 districts and "Be Updated" for 2 districts.

Observed precipitation shows the higher hit rate (rainfall) in the case of eastern and central Nepal. Precipitation was lower than expected over western part of Lumbini Province, Karnali Province and Sudurpaschim Province (Figure 3).



Figure 3: Forecast verification (Coloured district boundary shows the alert type, coloured dots show the amount of precipitation observed during the 3 day period and star sign shows the station with record breaking precipitation measured on 28 September)

5. Flood Forecast

The extreme flood event of the 11th and 12th of Ashoj was well forecasted through regular flood forecast bulletins issued on the 9th, 10th and 11th of Ashoj. After assessing the updated model forecasts on the 10th of Ashoj, a special flood forecasting bulletin was issued at 5 PM on the same day (Annex 4). Through the forecast bulletin, an extremely high flood risk (above danger level) was predicted for the Narayani, Bagmati, West Rapti, and Babai basins. Additionally, a high risk of flooding (near danger level) was forecasted for the Kamala and Kanai basins. Meanwhile, a medium risk of flooding was forecasted for the Saptakoshi and Karnali basins.

6. Verification of Flood Forecasts

During this period, major flooding was observed in Koshi Basin, Bagmati Basin and Narayani Basin. Based on the DHM's observation from the ground station, it was confirmed that the

Sunkoshi River at Hampachuwar, Saptakoshi at Chatara, Trishuli River at Kali Khola and Narayani River at Devghat have crossed the historic maximum flood level. All other stations within these catchments have reported water levels exceeding the designated danger levels though below their historic levels. Comparison between historic maximum and observed gauge height is presented in Table 4.

S.N.	St. Index	Station Name	Historic Extreme Date	Historic Gauge Height (m)	Observed Maximum Gauge Height on Ashoj 11 and 12 (m)
1	420	Kali Gandaki at Kota Gaon	7-Sep-1993	10.4	10.27
2	449.91	Trishuli River at Kali Khola	3-Jul-1999	13.1	14.97
3	450	Narayani River at Devghat	5-Aug-1974	10.1	13.62
4	550.05	Bagmati at Khokana	22-Jul-2002	6.0	6.16
5	589	Bagmati at Karmaiya (Padheradovan)	21-Jul-1993	20.0	10.86
6	681	Sunkoshi River at Hampachuwar	13-Jul-2019	14.3	14.5
7	695	Saptakoshi at Chatara	25-Jun-1980	11.5	11.83

Table 4: Comparison between historic maximum and observed gauge height of some of the major rivers.

The flood verification result for various forecast stations indicates a range of flood risks observed across different rivers on Asoj 11 and Asoj 12. Table 5 compares the forecasted flood risk levels with the observed water levels to evaluate the accuracy and effectiveness of the flood forecasting system. The flood verification analysis shows that the forecast system accurately predicted the flood risk levels for most stations. For Sapta Koshi and Narayani, the rising trends from moderate/high to very high were well-captured. Karnali and Mahakali consistently matched the low risk levels forecasted. Kankai and Kamala showed partial alignment, with forecasts and observations improving over time. Bagmati and Eastern Rapti forecasts successfully predicted the upward trends, matching the observed very high risks on Asoj 12. Western Rapti forecasts were consistent, aligning with both observed moderate and very high risks. However, Babai showed a discrepancy, with the forecasted very high risk not matching the observed low level on Asoj 12,

suggesting an overestimation. The analysis demonstrates that the flood forecasting system shows high accuracy across several key stations, especially in escalating or maintaining risk levels based on the water level observations. However, certain locations, such as Kankai and Babai, displayed discrepancies, suggesting areas for further calibration and refinement of the forecasting models. Overall, the system effectively identifies flood risks, providing valuable information for flood preparedness and risk management efforts.

	पूर्वानुमा	मापन गरिएको बाढी जोखिम	
बाढी मापन केन्द्र	असोज ११	असोज १२	(जलसतह)
सप्तकोशी, चतरा	मध्यम जोखिम	मध्यम जोखिम	अति उच्च जोखिम
नारायणी, देवघाट	उच्च जोखिम	अति उच्च जोखिम	अति उच्च जोखिम
कर्णाली, चिसापानी	न्यून जोखिम	मध्यम जोखिम	न्यून जोखिम
महाकाली, परिगाउँ	न्यून जोखिम	न्यून जोखिम	न्यून जोखिम
कन्काई, मैनाचुली	उच्च जोखिम	मध्यम जोखिम	उच्च जोखिम
कमला नदी, वेलसोत	उच्च जोखिम	मध्यम जोखिम	मध्यम जोखिम
बाग्मती, पधेरादोभान	उच्च जोखिम	अति उच्च जोखिम	अति उच्च जोखिम
पूर्वी राप्ती, रजैया	मध्यम जोखिम	उच्च जोखिम	अति उच्च जोखिम
पश्चिम राप्ती, कुसुम	मध्यम जोखिम	अति उच्च जोखिम	मध्यम जोखिम
बबई, चेपाङ	मध्यम जोखिम	अति उच्च जोखिम	न्यून जोखिम

Table 5: Forecasted flood risk and observed flood risk (Water level) at different forecast stations

An Emergency Observation Request (EOR) was issued by DHM on 30th September 2024. On behalf of DHM, the International Charter: Space and Major Disasters, along with Sentinel Asia, was activated by ADRC. The preliminary flood inundation and exposure area of the Kathmandu Valley, derived from satellite images, are presented in Figure 5, and a detailed analysis of the major affected areas is provided in the Annex 9.



Figure 5: Observed riverine flood extend in the regions of Kathmandu Valley derived from satellite images of 30th September

7. Information Dissemination

DHM disseminated the forecast information through bulletins, emails, social media posts, mass SMS, telephone and audio visual media. The details of information disseminated by the department is shown in Table 3. Areas where mass SMS were issued is shown in Annex 8.

Table 3: Information Dissemination (26-29 September)

Information	Meteorological	Flood Forecasting	
	Forecasting Division	Division	
Monsoon special Bulletin	2	1	
Regular Bulletin	8	4	
No of phone calls received	~ ,1105	~ 1,049	
Facebook posts	17	58	
Twitter posts	17	51	
No. of email recipients	~ 304	~ 1032	
Number of SMS Alert (Event number)	-	49	
SMS	-	40,93,795	
Live program	~ 11 (TV), ~ 14 (FM)	5 (TV), 10 (FM)	
Phone calls from Security agencies	3	7	

Phone calls from media	~ 43	33
Command Post Meetings at NEOC	2	
(Briefing by DDG and DG on 23 and 28		
September)		

ANNEXES

Annex 1: 66 hour (26 Sept 18Z to 29 Sept 12Z) Accumulated Precipitation Forecast by DHM's NWP model:



Annex 2: Special Monsoon Bulletin issued on 23 September at 06:00 PM



<mark>सुझावः</mark> से वर्षले विपेशतः कृषि क्षेत्रमा प्रभाव पर्ने देखिएकोले कृषि कर्महरु शूरु गर्नु भन्दा अगावै अध्यावधिक मौसम जनकारी तथा पूर्वानुमान नियमित हेर्नुहुन अनुरोध छ।

तसर्थ, वर्षको कारण भू-आय, वाडी, पहिंगे तथा गेयान वहाव (debris flow) को जोखिम रहेको र मनसुनमा रातीको समयमा पनी पर्ने सम्भावना वडि हुने गरेकोले शहरी तथा तराई क्षेत्रहरूमा डुवानको जोखिम रहेको, ठूला तथा साना नदी नाला र खोलाहरूमा पानीको सतह वढ्न सक्ने, दैनिक जन-जीवन, कृषि, स्वास्थ्य, पर्यटन,सडक तथा हवाई यातायात समेत प्रभावित हुन सक्ने भएकोले आवश्यक सतर्कता तथा पूर्व तयारी अपनाउनु हुन सर्वसाधारण तथा सबै सरोकारवाला निकायहरूमा अनुरोध छ।

यस मनसुनी प्रणालीलाई मौसम पूर्वानुमान महाशाखाले निरन्तर अनुगमन गरिरहेको छ र सोही अनुसार नियमित रूपमा अधावधिक गर्दै जानेछ। तसर्थ, यस महाशाखाबाट जारी हुने तीन दिने मौसम बुलेटिन नियमित हेर्नुहुन र अधावधिक मौसमी सूचनाको जानकारी लिनुहुन अनुरोध छ ।

पुनक्षः मनसुनी वर्षाको जिल्लागत जोखिमको विवरण महाशाखाको वेभसईटबाट हेर्न सकिन्छ ।

Annex 3: Special Monsoon Bulletin issued on 25 September at 03:00 PM



साथै मिति २०८१ असोज १२ गते (शनिवार) देशभर साधारणतया देखि पूर्णतया वदली रही देशका अधिकांश स्थानहरू हल्का देखि मध्यम वर्षाको सम्भावना रहेको र वागमती प्रदेशका, गण्डकी प्रदेश, लुम्बिनी प्रदेश तथा कर्णाली प्रदेशका केही स्थानहरू र बाँकी प्रदेशका थोरे स्थानहरूमा मेछ गर्जन/चट्याङ सहित भारी देखि धेरे भारी वर्षाको समेत सम्भावना रहेको छ। साथै देशका लुम्बिनी प्रदेश, गण्डकी प्रदेश तथा कर्णाली प्रदेशका केही स्थानहरूमा हाबहुरीको समेत सम्भावना रहेको छ।

मिति २०८१ असोज १३ गते (आइतवार) देशभर आशिक देखि साधारणतया वदली रही देशभर हल्का देखि मध्यम वर्षाको सम्भावना रहेको र गण्डकी प्रदेश, लुम्बिनी प्रदेश र कर्णाली प्रदेशका एक-दुई स्थानमा मेघ गर्जन/चट्याङ सहित भारी वर्षाको सम्भावना रहेको छ ।

चेतावनी तथा परामर्श (Warning/Advisory):

यस प्रणालीको प्रभावले विशेष गरी वर्षाको कारण भू-अय, बाढी, पहिरो तथा गेगान बहाव (debris flow) को जोखिम रहेको र मनसुनमा रातीको समयमा पानी पर्ने सुम्भावना बढि हुने गरेकोले शहरी तथा तराई अवहरूमा डुवानको जोखिम रहेको, ठूला तथा साना नदी नाला र खोलाहरूमा पानीको सतह बड्न सबने, दैनिक जन-जीवन, कृषि, स्वारम्थ, पर्यटन,नदी अव आसपासका निर्माण कार्य, सडक तथा हवाई यातायात समेत प्रभावित हुन सबने भएकोले आवश्यक सतर्कता तथा पूर्व तयारी अपनाउनु हुन सर्वसाधारण तथा सबे सरोकारवाला निकायहरूमा अनुरोध छ।

यस मनसुनी प्रणालीलाई मौसम पूर्वानुमान महाशाखाले निरन्तर अनुगमन गरिरहेको छ र सोही अनुसार नियमित रूपमा अधावधिक गर्दै जानेछ। तसर्थ, यस महाशाखाबाट जारी हुने तीन दिने मौसम बुलेटिन नियमित हेर्नुहुन र अधावधिक मौसमी सूचनाको जानकारी लिनुहुन अनुरोध छ ।

नेपाल सरकार								
ऊर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय								
			जल तथा मोर	तम विज्ञान विभा	ग			
		म	रिसम पूर्वानु	मान महाश	ाखा			
मिति २०८१	१-०६-१० गते	देखि मि	ति २०८१-०६.	.१३ गते सम्म	का लागि मनर्	पुनी वर्षाको वि	जेल्लागत	
			जोखिम	को विवरण				
			जारी मितिः २	०८१/०६/०९ र	गते			
जोखिम⁄								
प्रदेश	कोशी	मधेश	बागमती	गण्डकी	लुम्बिनी	कर्णाली	सुदूरपश्चिम	
	झापा	सिराहा	मकवानपुर	म्याग्दी	रुकुम पुर्व	जाजरकोट	डोटी	
	सुनसरी	सप्तरी	चितवन	बाग्लुङ	रोल्पा	रुकुम-पश्चिम	कैलाली	
	धनकुटा	पर्सा	धादिङ्ग	तनहुँ	गुल्मी	देलेख	अछाम	
	तेह्रथुम		नुवाकोट	स्याङ्जा	प्युठान	सुर्खेत		
				नवलपरासी				
	खोटाङ्ग		रसुवा	पुर्व	अर्घाँखाची	सल्यान		
,उक्त जोग्विम	ओखलढुङ्गा		काठमाण्डो	कास्की	पाल्पा			
	उदयपुर		भक्तपुर	पर्वत	दाङ			
	भोजपुर		ललितपुर	लमजुङ	कपिलवस्तु			
	ईलाम		काभ्रेपलाञ्चोक	गोर्खा	रुपन्देही			
					नवलपरासी			
	पाँचथर		सिन्धुपालचोक	मनाङ्ग	पश्चिम			
	मोरङ्ग		सिन्धुली		ৰাঁক			
			रापेछाप		बदिया			
	ताप्लेजुङ्ग	बारा	दोलखा	मुस्ताङग		डोल्पा	डडेलधुरा	
मध्यम जोखिम	संखुवासभा	धनुषा				कालिकोट	कञ्चनपुर	
	सोलुखम्बु	रौतहट				जुम्ला	ৰহ্বাङ্গ	
		सर्लाही					बाजुरा	
		महोत्तरी					दार्चुला	
							बैतडी	
निम जोखिम						मुगु		
						हम्ला		

Annex 4: Special Flood Forecast Bulletin issued on 26 September at 05:00 PM

नेपात सरकार		
उजी, जलस्रीत तथा सिंचाइ मन्सालय		
जल तथा मौसम विज्ञान विभाग		
बाढी पूर्वानुमान महाशाखा		
बिशेष बाढी पूर्वानुमान बुलेटिन (Special Flood	Forecast	Bulletin)

(जारी मितिः २०८१-०६-१० गते सौंझ ०५ बजे)

बंगालको खाडीमा बिकसित भएको न्यून चापीय प्रणालीको प्रभावले आगामी ४ दिन देशैभरका नदीहरुको बहाब बढ्ने पूर्वानुमान रहेको छ । प्रमुख नदीहरुमा बाढी जोखिमको पूर्वानुमान यस प्रकार रहेको छ ।

बाढीको जोखिम पूर्वानुमान (हरेक दिन विहान ७ बजे देखि २४ घण्टा)

क.सं.	नदीको नाम	२०८१-०६-१०	२०८१-०६-११	२०८१-०६-१२	२०८१-०६-१३
٩	संसकोशी, चतरा	न्यून जोखिम	मध्यम जोखिम	मध्यम जोखिम	न्यून जोखिम
२	नारायणी, देवघाट	न्यून जोखिम	उच्च जोखिम	अति उच्च जोखिम	मध्यम जोखिम
3	कर्णाली, चिसापानी	न्यून जोखिम	न्यून जोखिम	मध्यम जोखिम	न्यून जोखिम
۲	महाकाली, परिगाउँ	न्यून जोखिम	न्यून जोखिम	न्यून जोखिम	न्यून जोखिम
X	कन्काई, मैनाचुली	मध्यम जोखिम	उच्च जोखिम	मध्यम जोखिम	न्यून जोखिम
Ę	कमला नदी, वेलसोत	न्यून जोखिम	उच्च जोखिम	मध्यम जोखिम	न्यून जोखिम
6	बाग्मती, पंचेरादोभान	न्यून जोखिम	उच्च जोखिम	नति उच्च नोखिम	मध्यम जोखिम
5	पूर्वी राप्ती, रजैया	न्यून जोखिम	मध्यम जोखिम	उच्च जोखिम	न्यून जोखिम
٩	पश्चिम राप्ती, कुसुम	न्यून जोखिम	मध्यम जोखिम	नति उच्च नोखिम	मध्यम जोखिम
90	बबई, चेपाङ	न्यून जोखिम	मध्यम जोखिम	बति उच्च जोखिम	मध्यम जोखिम

सरोकारवालालाई परामर्श

असोज ११, १२ र १३ गते देशका अधिकांश नदीहरुको बहाव सतर्कता तह आसपास रहने पूर्वानुमान रहेको र नारायणी नदी देवघाट, कन्काई नदी मैनाचुली, कमला नदी बेलसोत, बाग्मती पघेरादोभान, पूर्वी रासी रजेैया, पश्चिम रासी कुसुम, बबई चेपाङ नदी र <mark>यसका सहायक नदीहरुमा जलसतह</mark> खतरा तह आसपास रहने तथा <mark>केहीमा खतरा तह</mark> पार गर्ने पूर्वानुमान रहेकोले नदी तटिय क्षेत्रमा <mark>बति उच्च सतर्कता अपनाउनुहुन</mark> अनुरोघ छ ।

बसोज १४ गते सोमबार देखि यस प्रणाली कमजोर हुने र नदीमा बहाव ऋमश घट्दै जाने पूर्वानुमान छ । यस प्रणाली सम्बन्धी थप जानकारी र स-साना नदीहरुको आकस्मिक बाढी (Flash Flood) को जोखिम पूर्वानुमान दैनिक बाढी पूर्वानुमान बुलेटिनमा अघ्यावधिक गरिनेछ ।

(बाढी पूर्वानुमान बुलेटिन यस विभागको बेबसाइट मा समेत हेर्न सकिने छ। साथै विभागको फेसबुक पेज 'Nepal Flood Alert-नेपाल बाढी सूचना' र विभागको ट्विटर 'Nepal Flood Alert! नेपाल बाढी सूचना।' हेरौँ। /

नोटः

हरियो रङले जलसतह सतर्कता तह भन्दा तलै रहने र बाढीको <mark>न्यून जोखिम</mark> हुने संकेत गर्दछ। पहेलो रङले जलसतह सतर्कता तह आसपास पुग्ने र बाढीको मध्यम जोखिम रहेको संकेत गर्छ। <mark>सुन्तला</mark> रङले जलसतहले सतर्कता तह पार गर्ने र बाढीको <mark>उच्च जोखिम</mark> रहेको संकेत गर्दछ। <mark>रात</mark>ी रङले जलसतहले खतरा तह पार गर्ने र बाढीको <mark>बति उच्च जोखिम</mark> हुने संकेत गर्दछ।









Annex 6: Areas where flood mass SMS alert was issued for public







Data sources:

(1) Post image- Satellite Data: Spot-6, Imagery Dates: 30 September 2024 at 08:35 UTC, Resolution : 50 cm, Source : CNES / SPOT6

(2) Pre-image- Satellite Data: WorldView-2, Imagery Dates: 13 January 2024, Resolution : 50 cm, Source: ESRI Basemap