



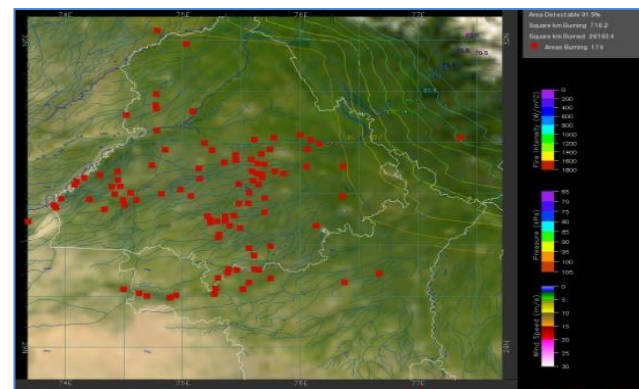
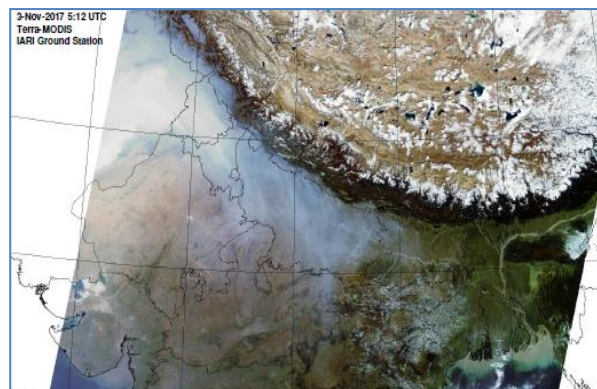
**Bulletin
No. 20**

**Events Date:
04-Oct-2021**

**Issued on:
04-Oct-2021**



MONITORING PADDY RESIDUE BURNING IN INDIA USING SATELLITE REMOTE SENSING DURING 2021



Prepared by:

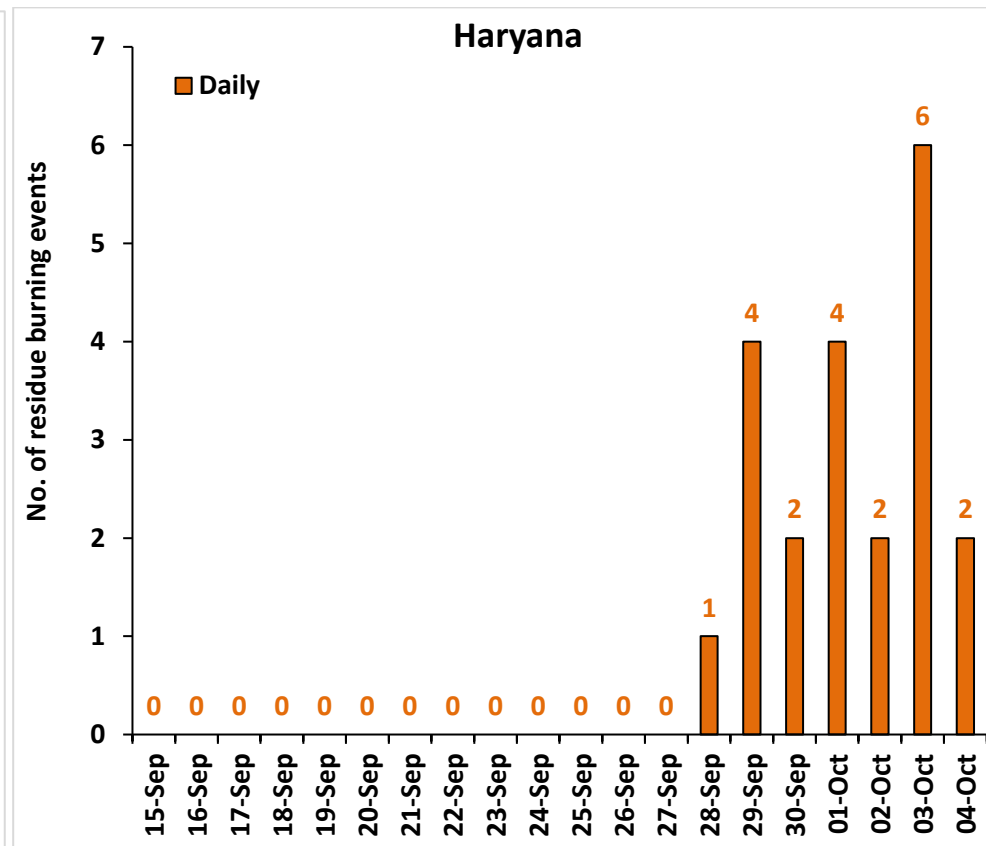
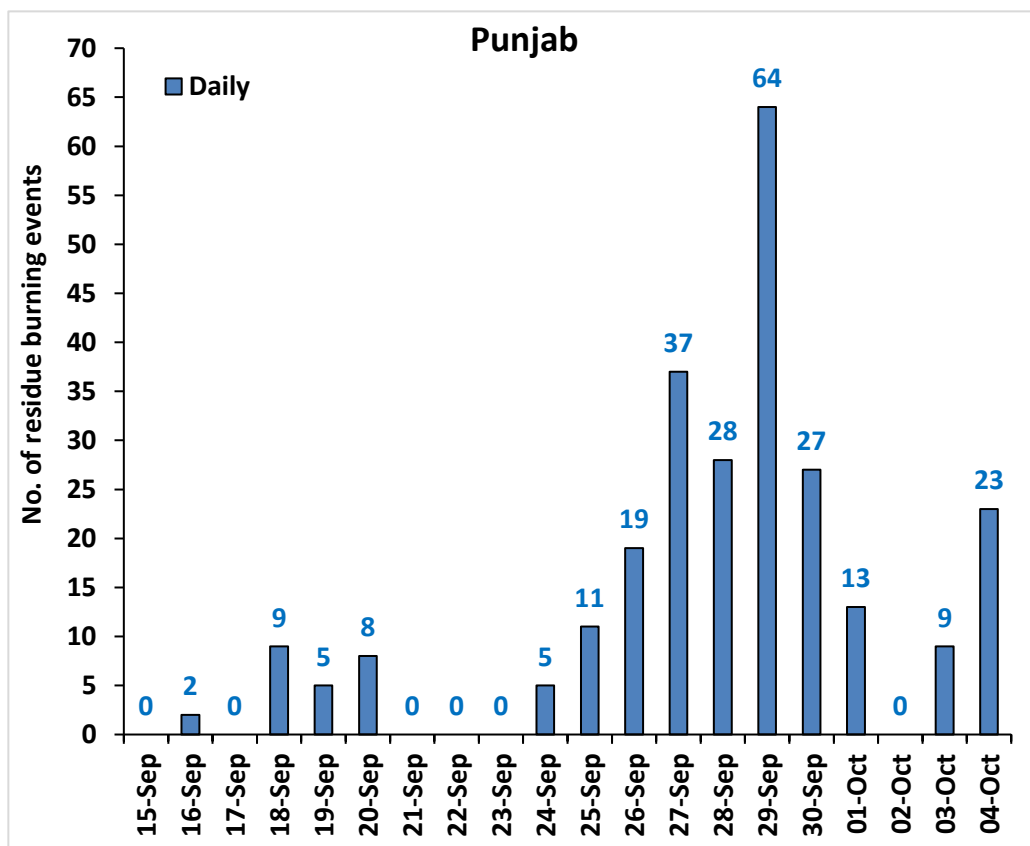
**Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012**

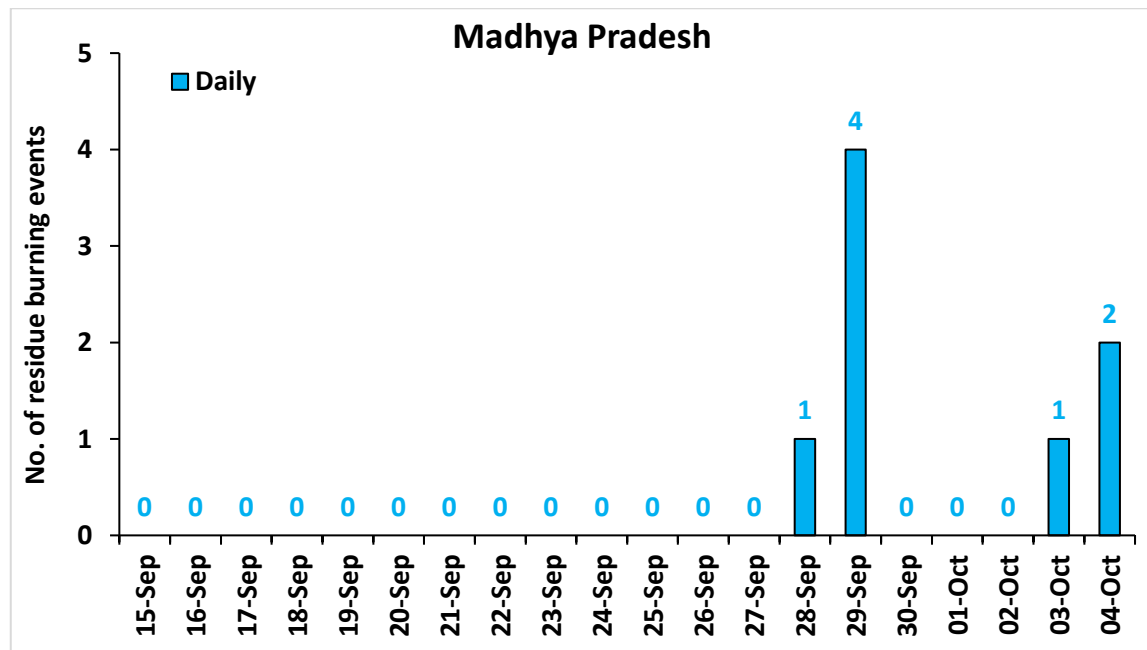
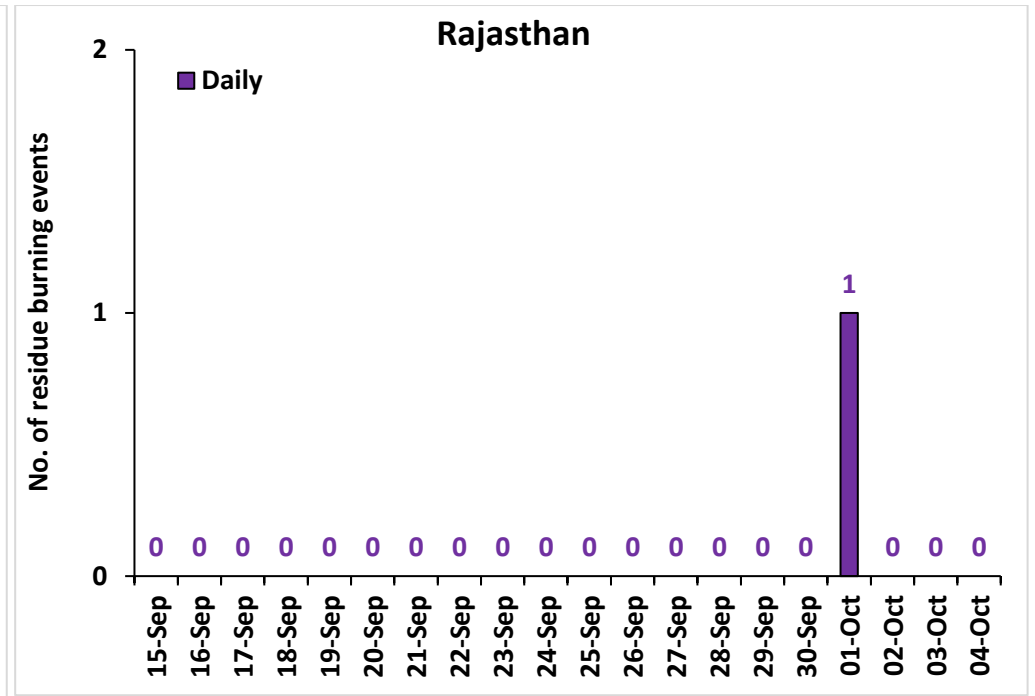
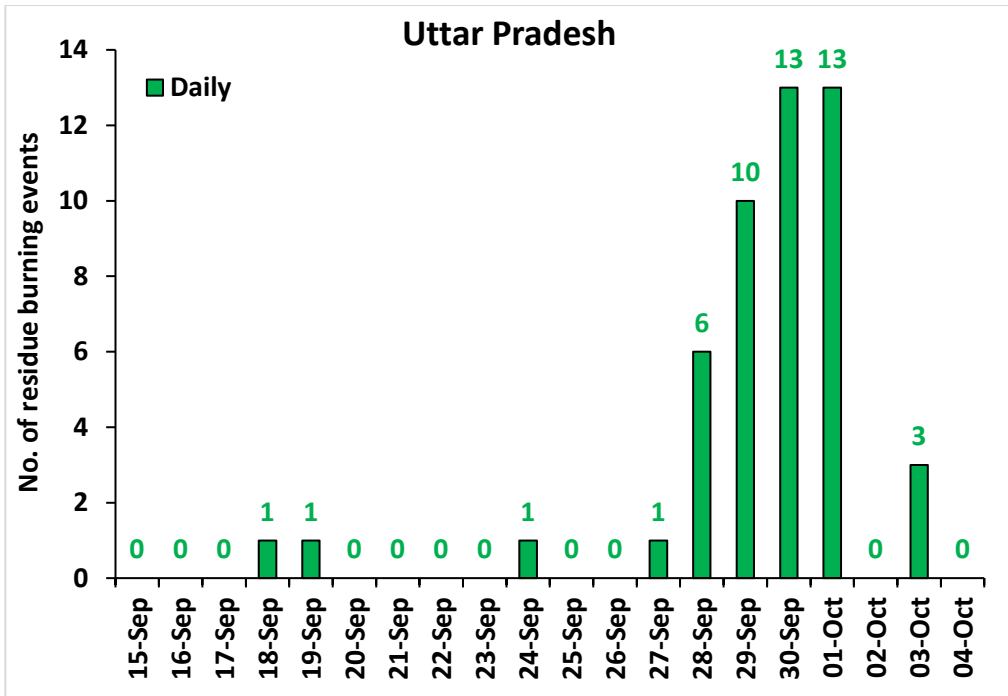
<http://creams.iari.res.in>

Highlights for 04-October-2021

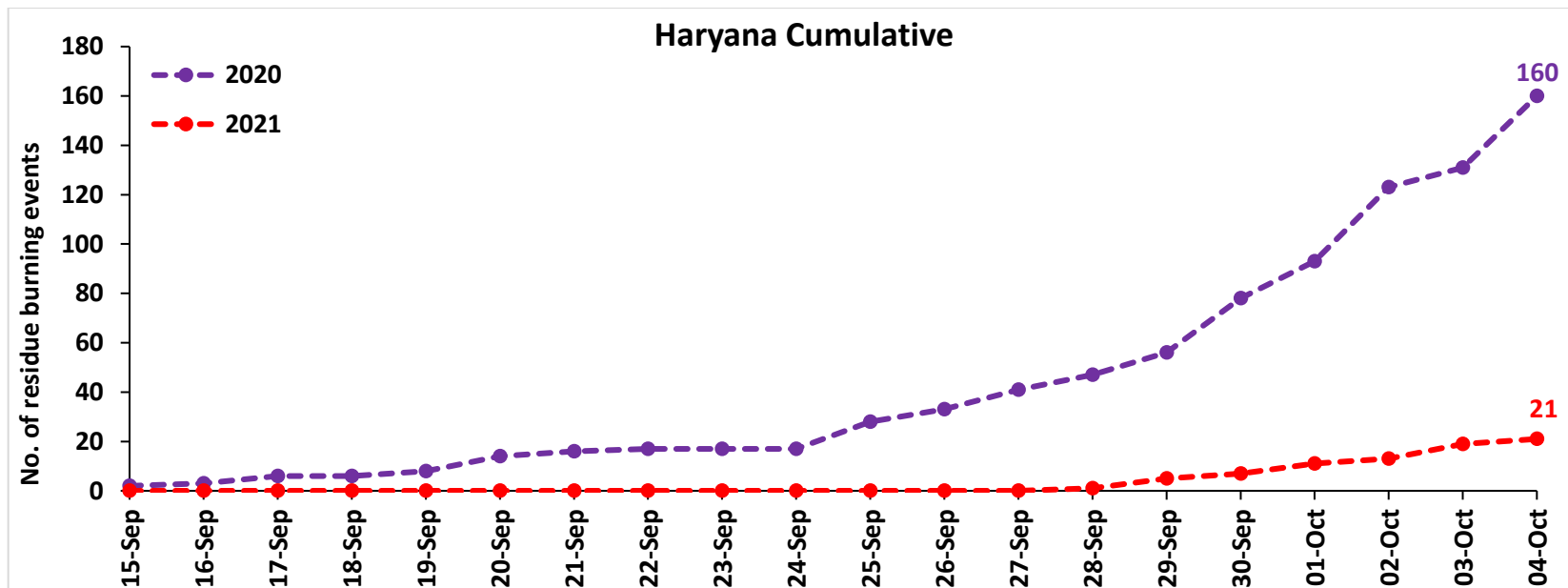
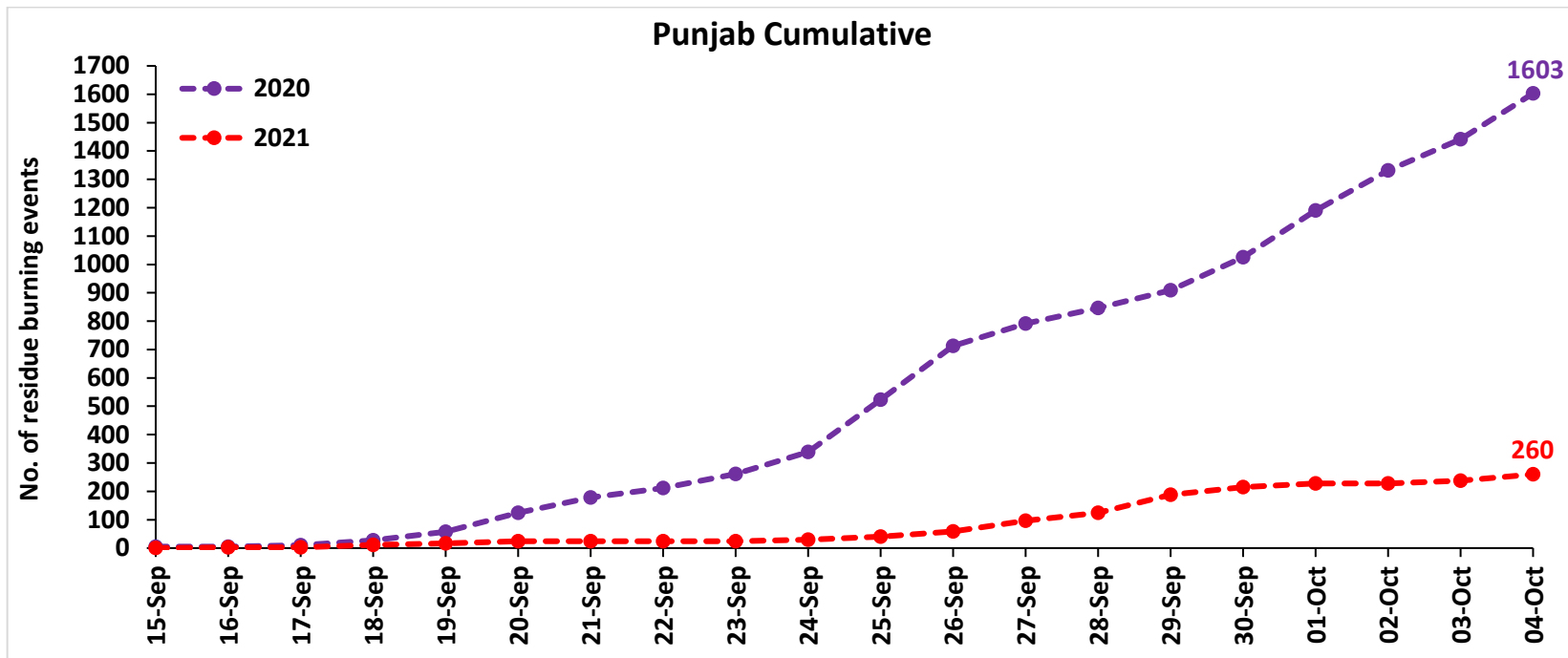
- The active fire events due to rice residue burning were monitored using satellite remote sensing, following the new "Standard Protocol for Estimation of Crop Residue Burning Fire Events using Satellite Data".
- Satellites detected **27** residue burning events in the six study States on 04-Oct-2021.
- The state wise events detected on 04-Oct-2021 were **23** in Punjab, **2** in Haryana, **0** in UP, **0** in Delhi, **0** in Rajasthan and **2** in MP.
- Detection of burning events by satellites was hampered due to scattered clouds over all the study states.

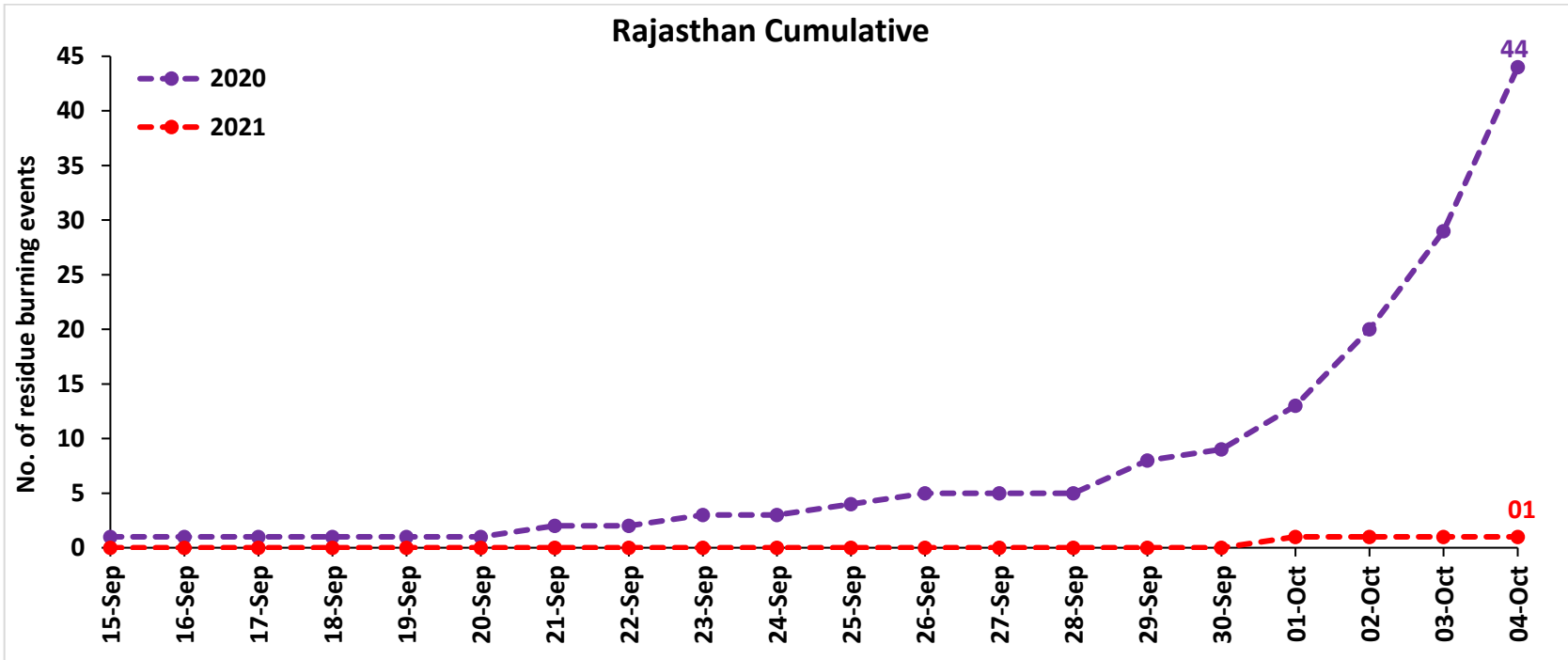
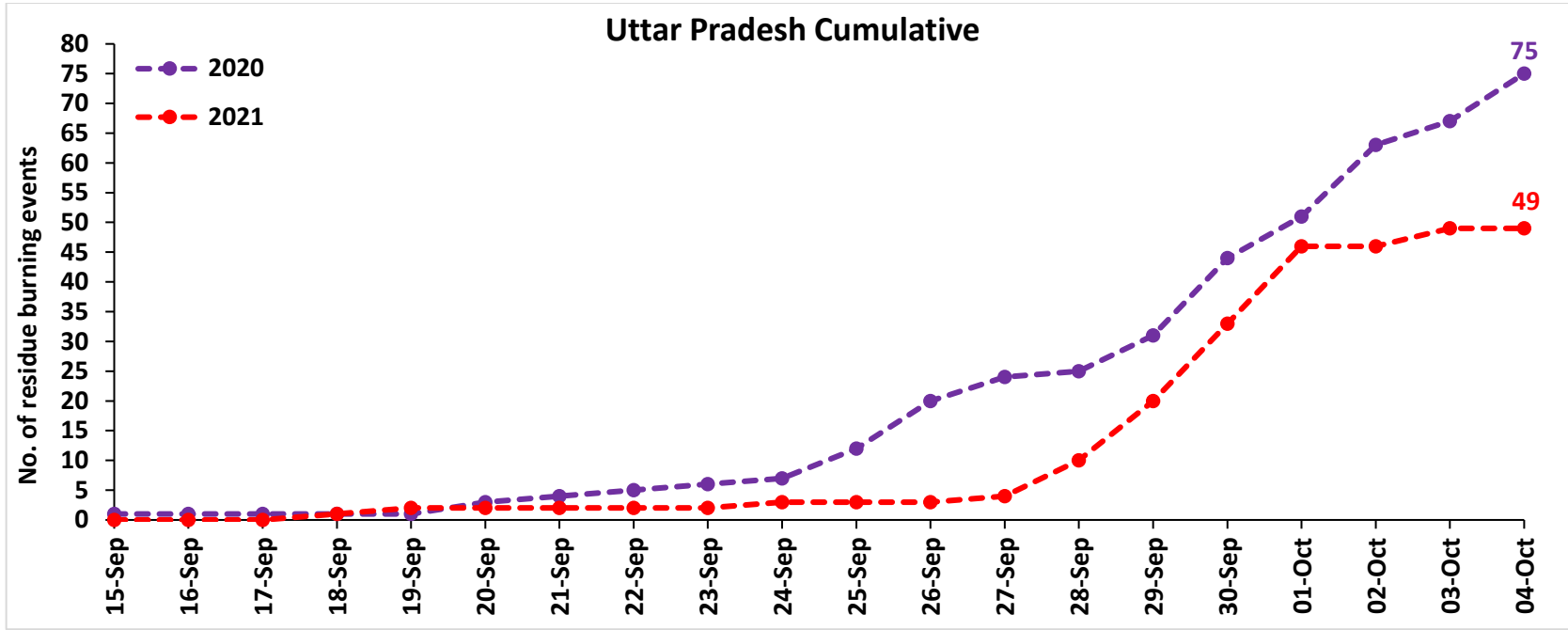
Temporal distribution of rice residue burning events for the study States in 2021

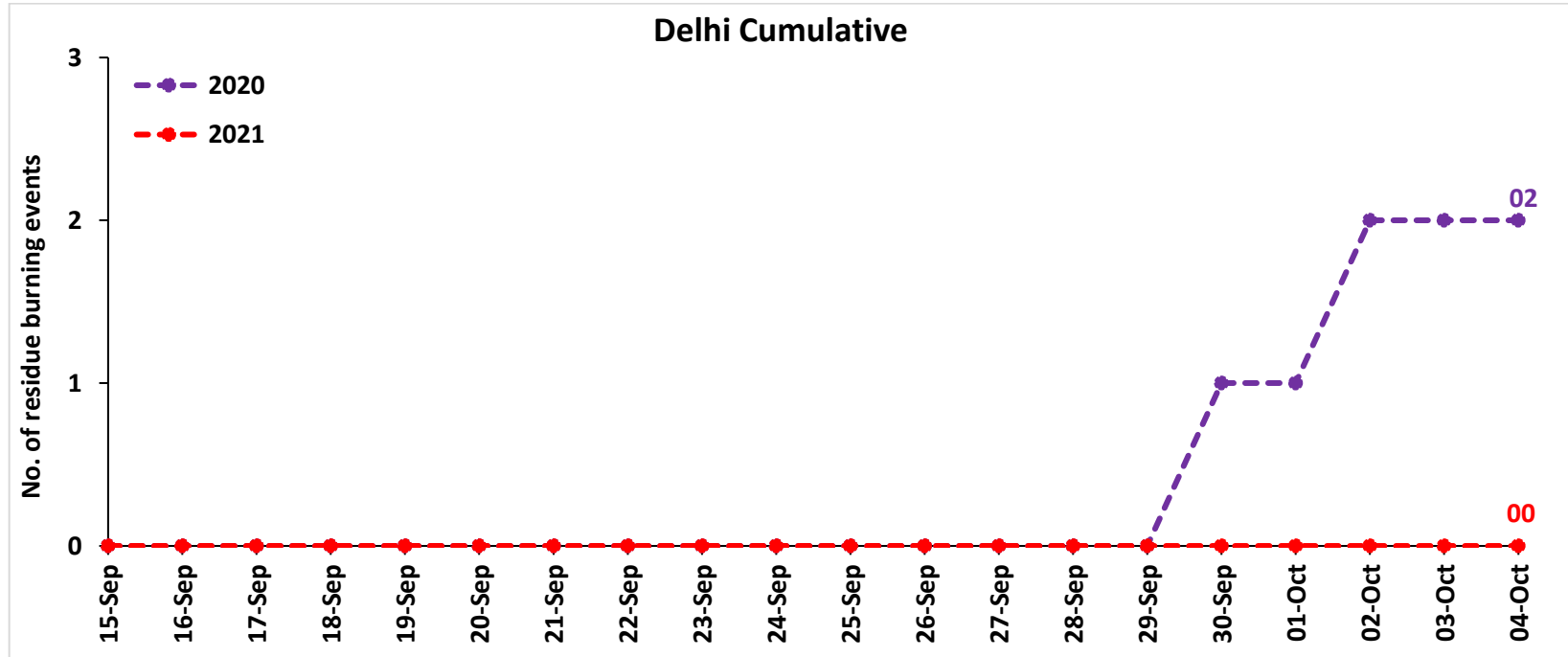
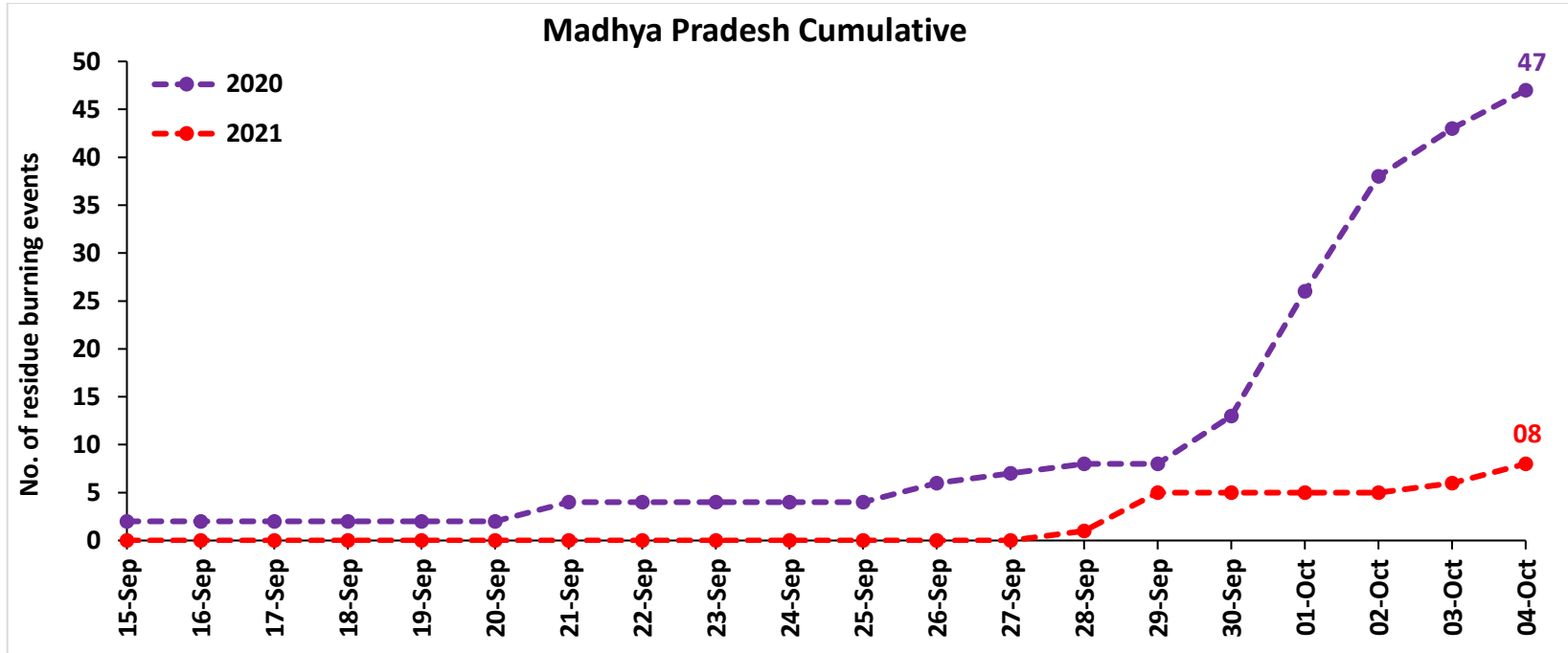




Comparison of residue burning events in current year (2021) with previous year (2020) for the study States

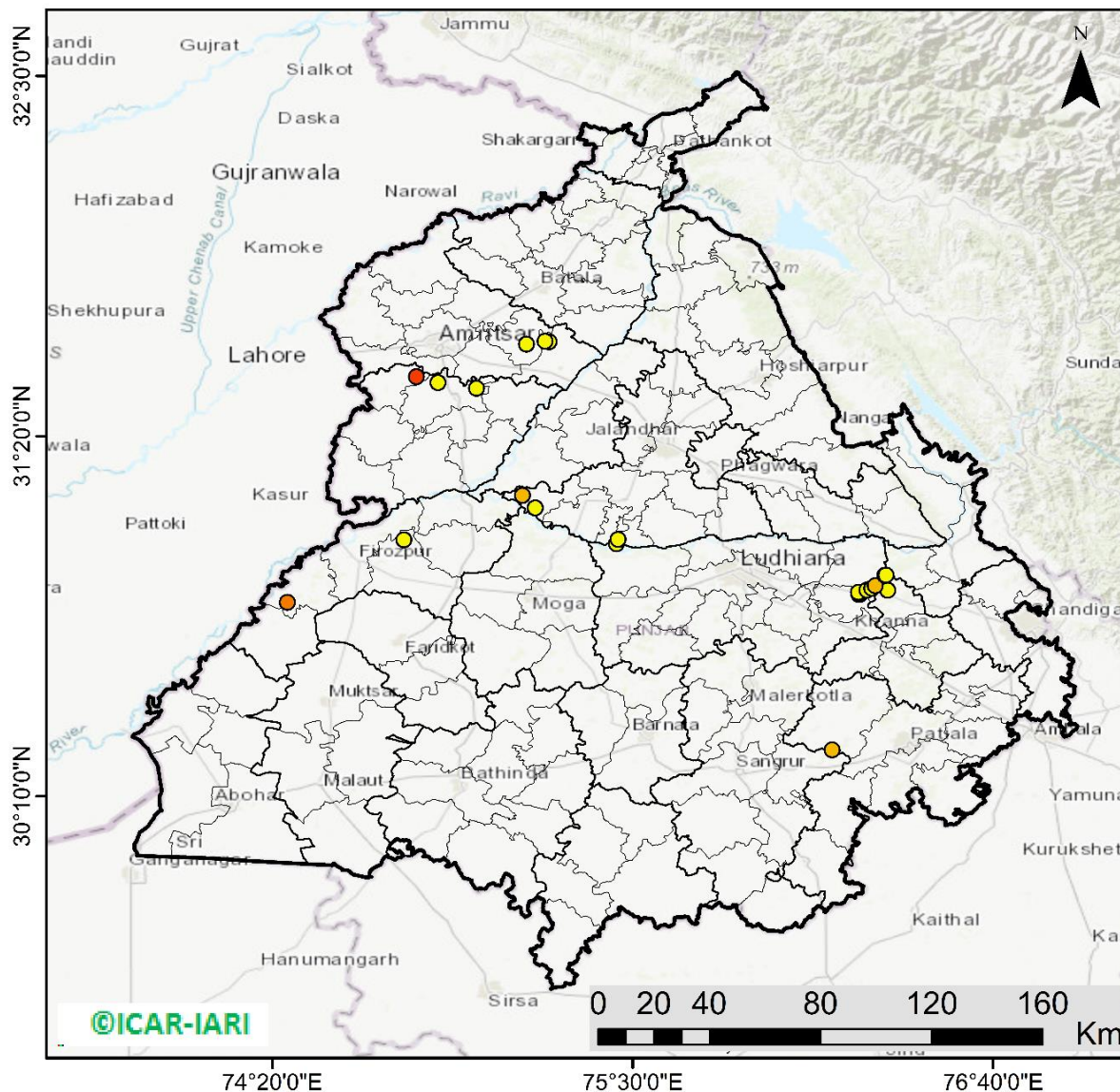






Punjab

RICE RESIDUE BURNING IN PUNJAB



23 burning events detected in Punjab on **04th October 2021**

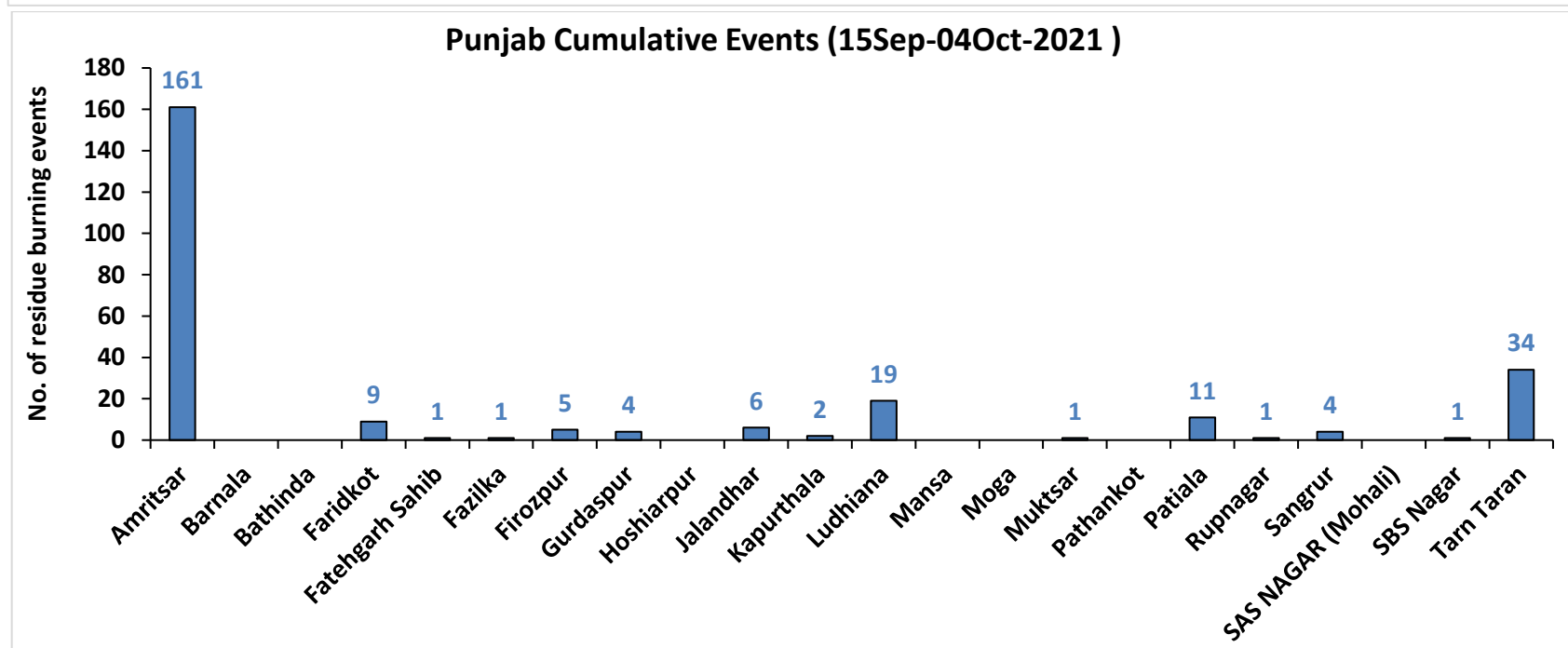
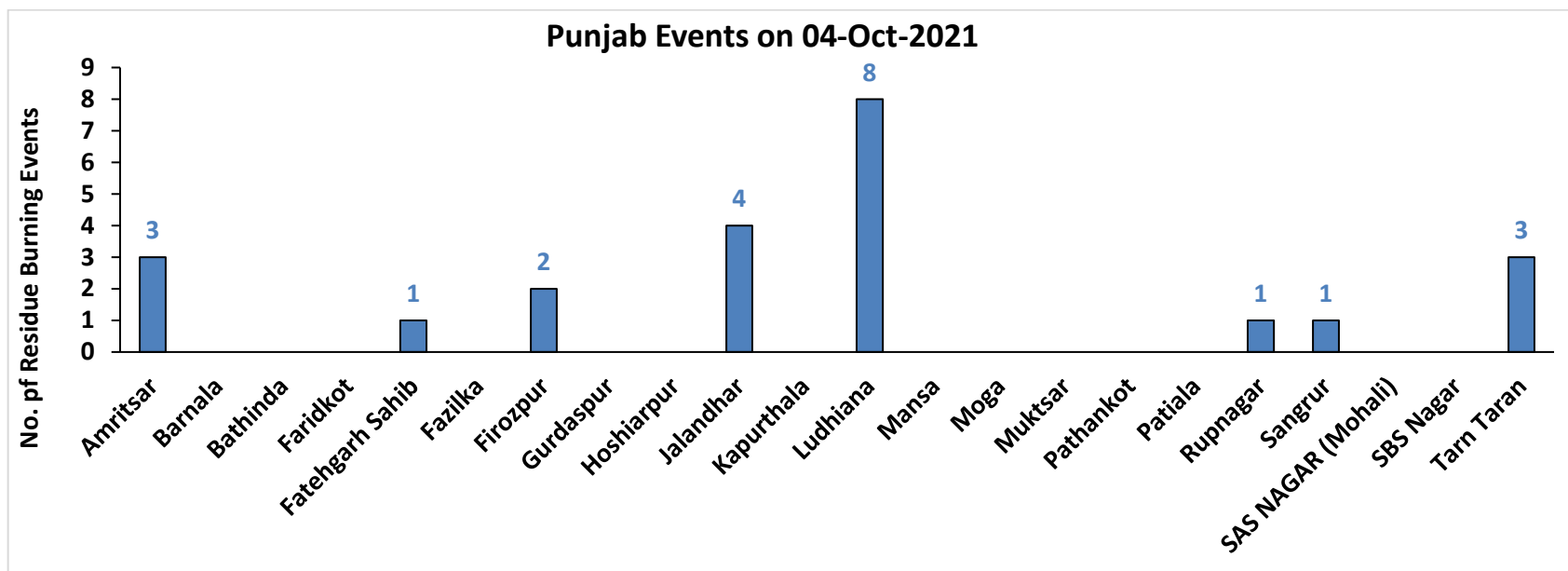
Fire Intensity (W/m²)

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



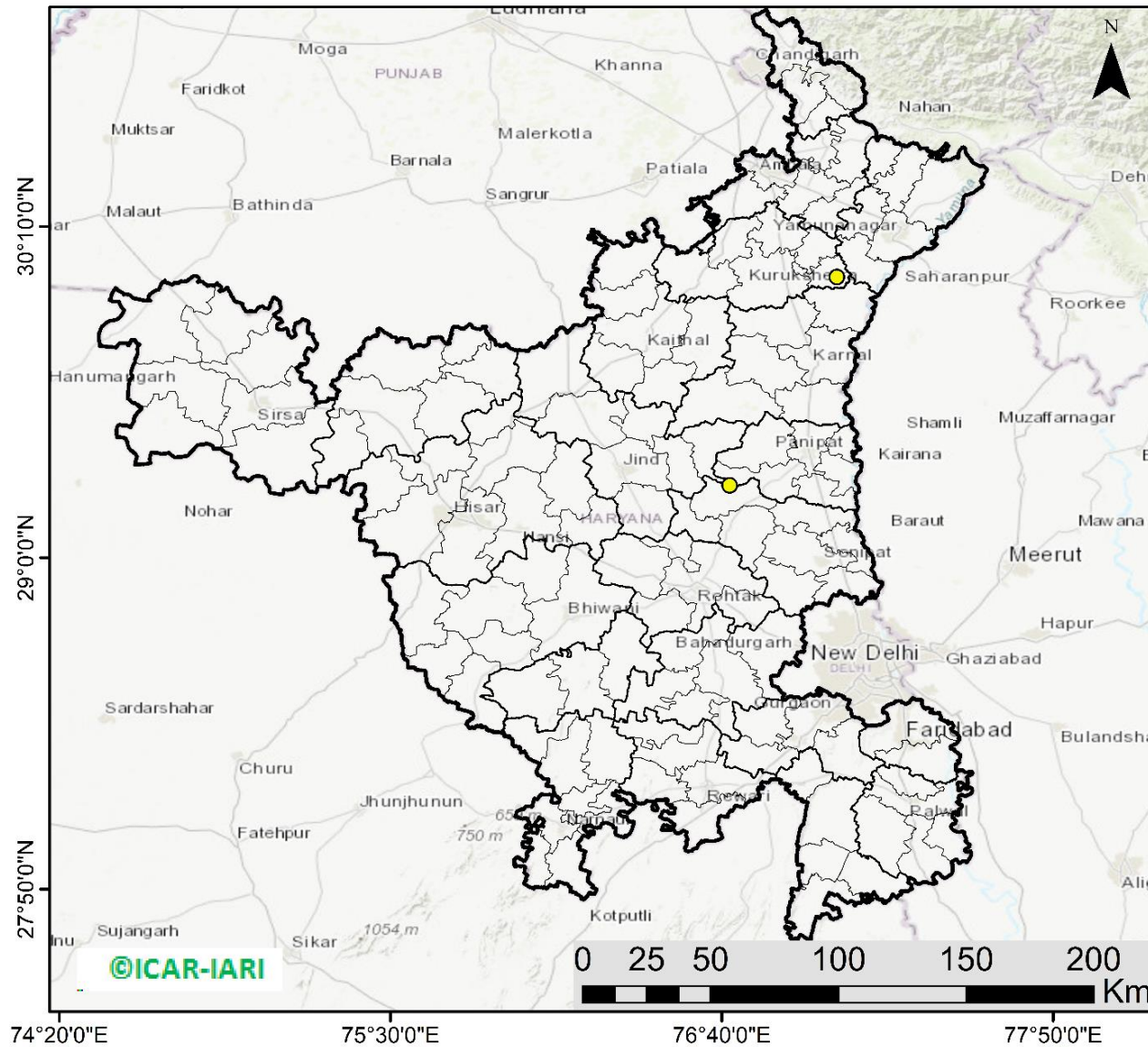
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Punjab (15Sep - 04Oct-2021)



Haryana

RICE RESIDUE BURNING IN HARYANA



02 burning events detected in Haryana on **04th October 2021**

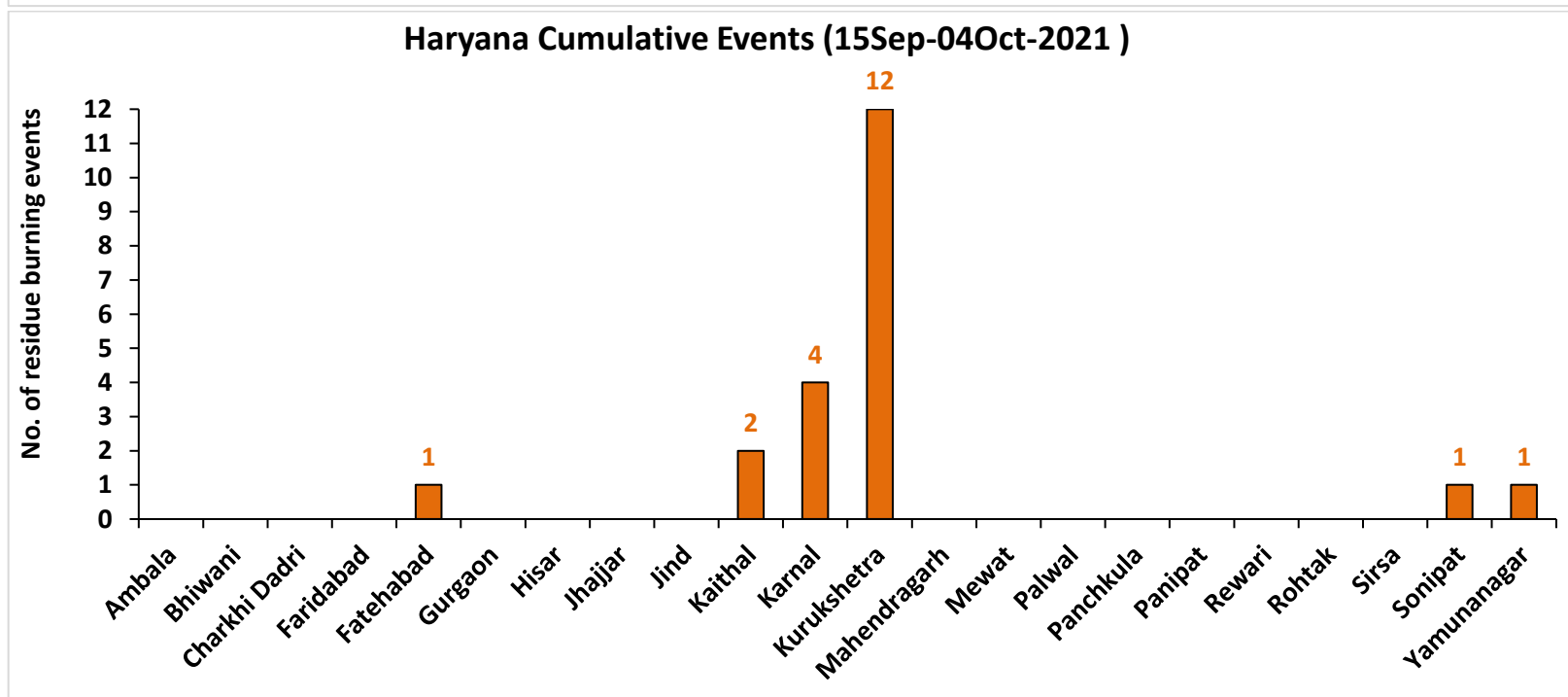
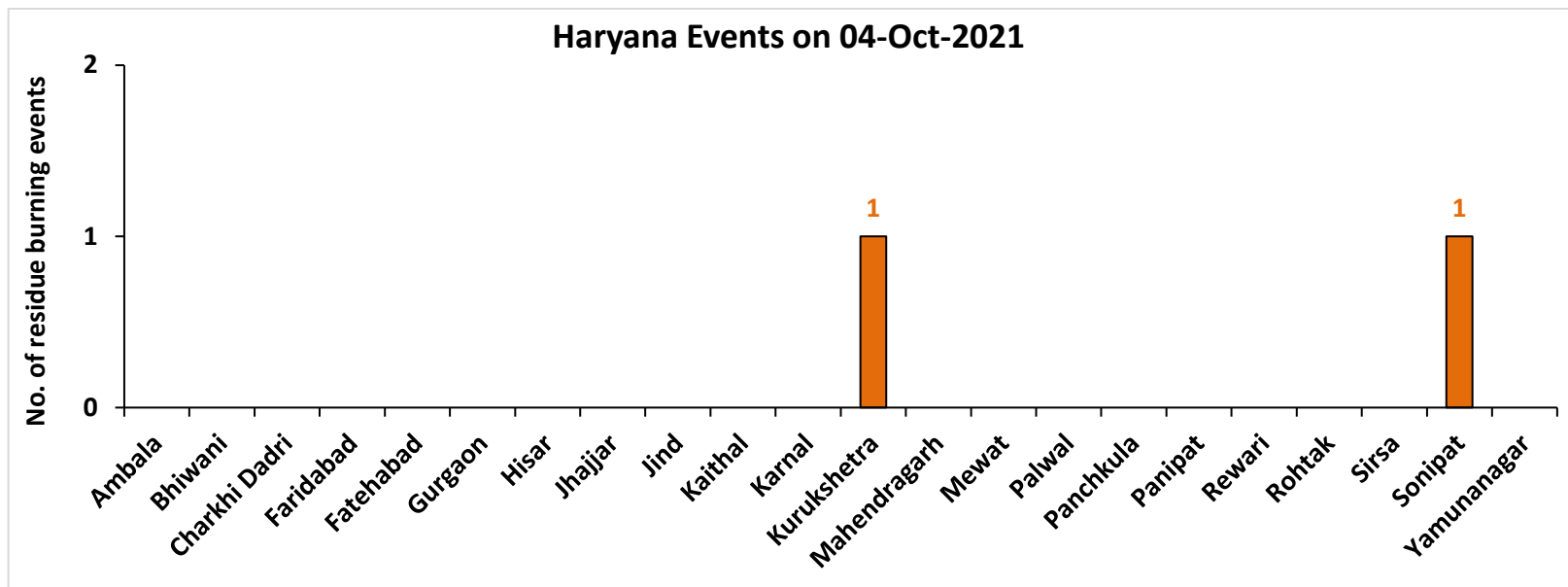
Fire Intensity (W/m²)

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



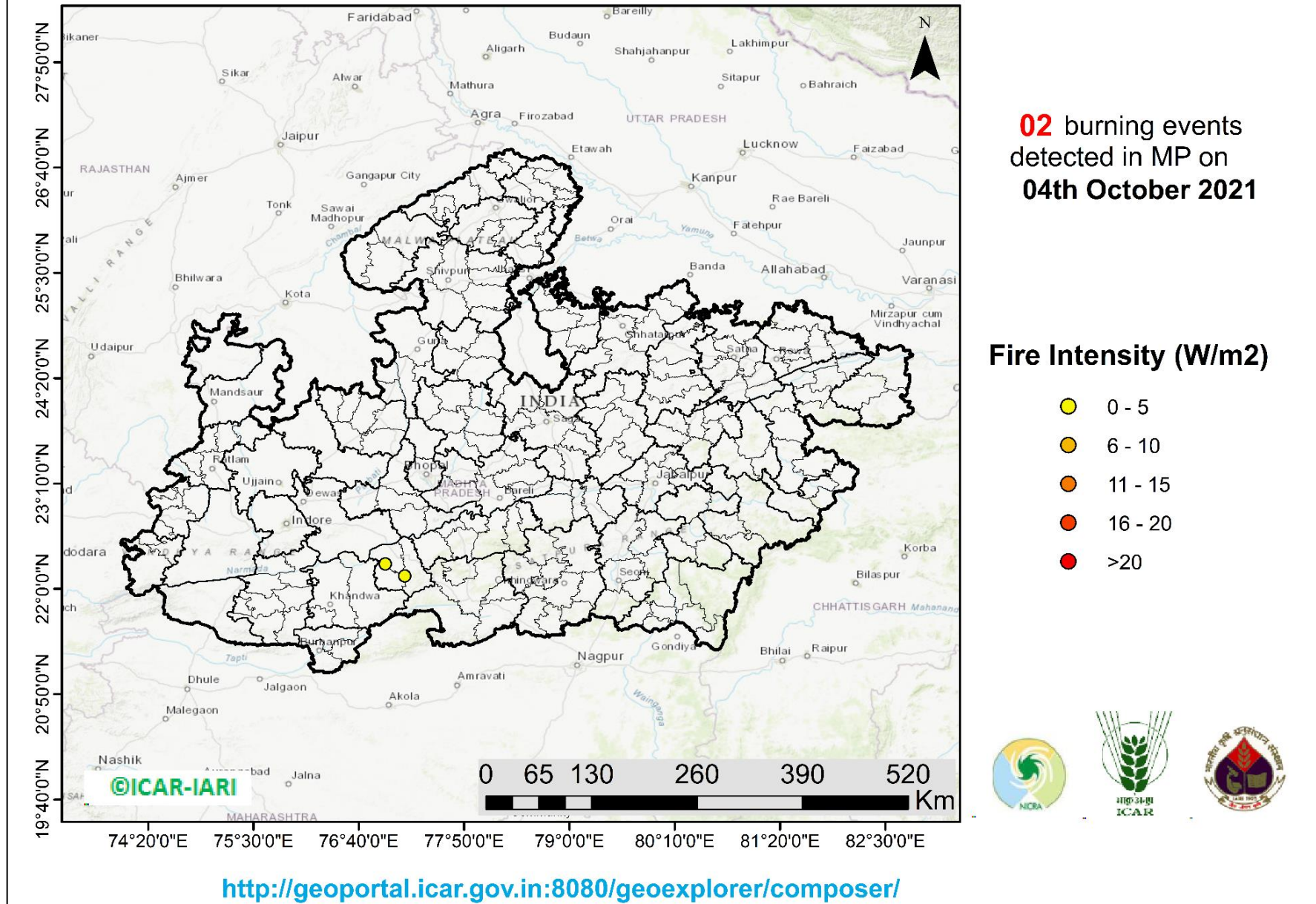
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Haryana (15 Sep - 04 Oct-2021)

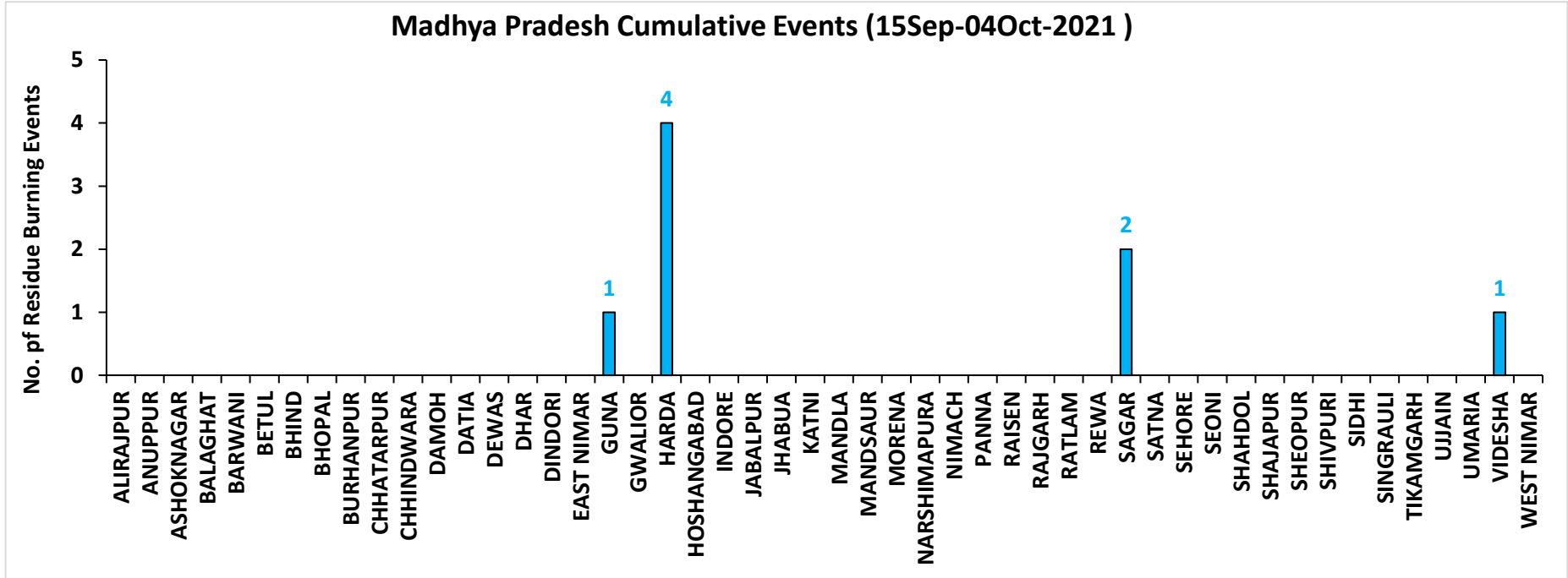
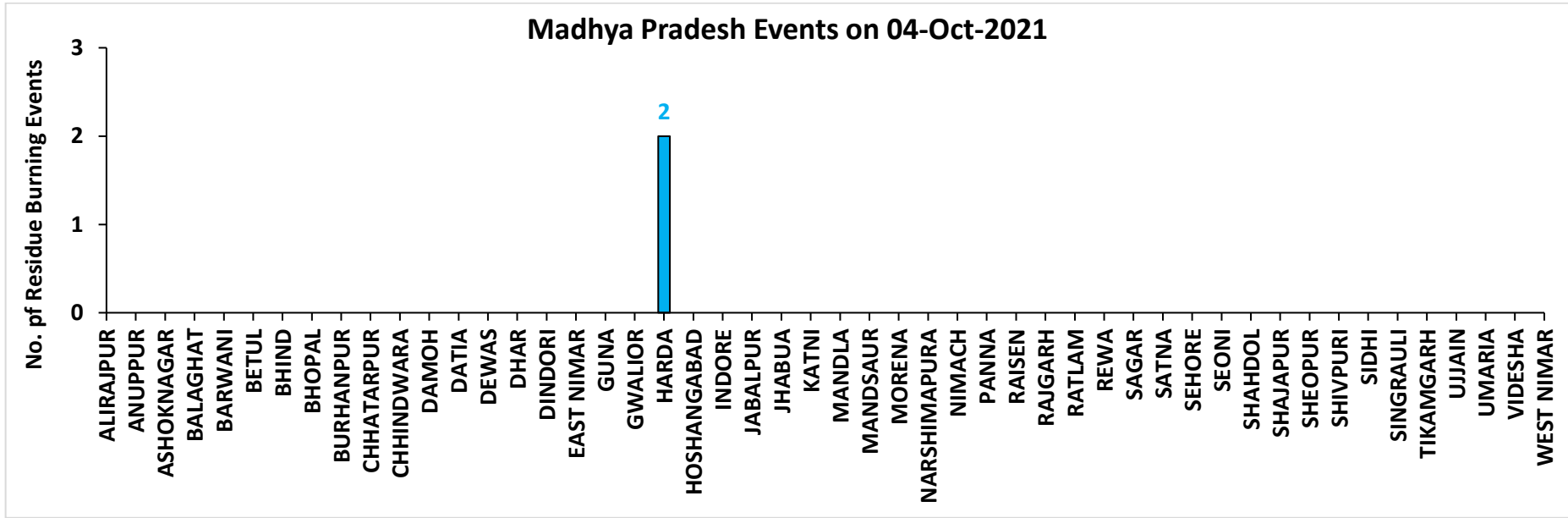


Madhya Pradesh

RICE RESIDUE BURNING IN MADHYA PRADESH



District-wise cumulative number of residues burning events in Madhya Pradesh (15 Sep - 04 Oct-2021)



District-wise cumulative number of residues burning events detected in 2020 and 2021

(Period: 15 September - 04 October)

(a) Punjab

District	15 Sep – 04 Oct	
	2020	2021
AMRITSAR	1015	161
BARNALA	2	0
BATHINDA	0	0
FARIDKOT	3	9
FATEHGARH SAHIB	15	1
FAZILKA	0	1
FIROZPUR	22	5
GURDASPUR	54	4
HOSHIARPUR	3	0
JALANDHAR	13	6
KAPURTHALA	22	2
LUDHIANA	34	19
MANSA	2	0
MOGA	9	0
MUKTSAR	1	1
PATHANKOT	0	0
PATIALA	63	11
RUPNAGAR	1	1
SANGRUR	17	4
SAS NAGAR (MOHALI)	8	0
SBS NAGAR	2	1
TARN TARAN	317	34
Total	1603	260

(b) Haryana

District	15 Sep – 04 Oct	
	2020	2021
AMBALA	22	0
BHIWANI	0	0
CHARKHI DADRI	0	0
FARIDABAD	0	0
FATEHABAD	15	1
GURGAON	0	0
HISAR	3	0
JHAJJAR	0	0
JIND	2	0
KAITHAL	21	2
KARNAL	46	4
KURUKSHETRA	31	12
MAHENDRAGARH	0	0
MEWAT	0	0
PALWAL	1	0
PANCHKULA	0	0
PANIPAT	6	0
REWARI	0	0
ROHTAK	0	0
SIRSA	1	0
SONIPAT	2	1
YAMUNANAGAR	10	1
Total	160	21

(c) Uttar Pradesh

District	15 Sep – 04 Oct							
	2020	2021	GAUTAMBUDHNAGAR	1	0	MUZAFARNAGAR	2	0
AGRA	0	0	GAZIPUR	0	0	PILHIBHIT	3	1
ALIGARH	4	0	GHAZIABAD	1	0	PRATAPGARH	0	0
ALLAHABAD	0	0	GONDA	0	0	RAIBEARELI	1	0
AMBEDKARNAGAR	0	0	GORAKHPUR	0	0	RAMPUR	2	3
AMETHI	0	0	HAMIRPUR	0	0	SAMBHAL	5	0
AMROHA	0	0	HAPUR	2	0	SANTKABIRNAGAR	0	0
AURAIYA	11	0	HARDOI	0	0	SANTRAVIDASNAGAR	0	0
AZAMGARH	0	0	HATHRAS	0	0	SHAHJAHANPUR	5	37
BADAUN	0	0	JALAUN	0	0	SHAMLI	7	2
BAGHPAT	1	0	JAUNPUR	0	0	SHARANPUR	3	0
BAHRAICH	0	0	JHANSI	2	0	SHRAWASTI	0	0
BALLIA	0	0	KANNAUJ	1	0	SIDDHARTHANAGAR	0	0
BALRAMPUR	0	0	KANPUR	0	1	SITAPUR	1	0
BANDA	0	0	KANPUR DEHAT	1	0	SONBHADRA	0	0
BARABANKI	1	0	KASGANJ	0	0	SULTANPUR	0	0
BAREILLY	2	0	KAUSHAMBI	1	0	UNNAO	2	0
BASTI	0	0	KHERI	2	3	VARANASI	0	0
BIJNOR	1	0	KUSHINAGAR	0	0	Total	75	49
BULANDSAHAR	1	0	LALITPUR	0	1			
CHANDAULI	0	0	LUCKNOW	0	0			
CHITRAKOOT	0	0	MAHARAJGANJ	0	0			
DEORIA	0	0	MAHOPA	0	0			
ETAH	2	0	MAINPURI	0	0			
ETAWAH	0	0	MATHURA	2	1			
FAIZABAD	0	0	MAU	0	0			
FARRUKHABAD	0	0	MEERUT	6	0			
FATEHPUR	1	0	MIRZAPUR	0	0			
FIROZABAD	0	0	MORADABAD	1	0			

(d) Delhi

District	15 Sep – 04 Oct	
	2020	2021
CENTRAL	0	0
EAST	0	0
NEW DELHI	0	0
NORTH	1	0
NORTH EAST	0	0
NORTH WEST DELHI	0	0
SHAHADRA	0	0
SOUTH	1	0
SOUTH EAST	0	0
SOUTH WEST DELHI	0	0
WEST DELHI	0	0
Total	2	0

(e) Rajasthan

District	15 Sep – 04 Oct	
	2020	2021
AJMER	0	0
ALWAR	1	0
BANSWARA	0	0
BARAN	20	0
BARMER	2	0
BHARATPUR	0	0
BHILWARA	1	0
BIKANER	0	0
BUNDI	1	0
CHITTAURGARH	0	1
CHURU	0	0
DAUSA	0	0
DHOLPUR	0	0
DUNGARPUR	0	0
GANGANAGAR	1	0
HANUMANGARH	8	0
JAIPUR	0	0
JAISELMER	1	0
JALOR	0	0
JHALAWAR	0	0
JHUNJHUNUN	1	0
JODHPUR	1	0
KARAULI	1	0
KOTA	4	0
NAGAUR	0	0
PALI	1	0
PRATAPGARH	0	0
RAJSMAND	0	0
SIKAR	0	0
SIROHI	0	0
SWAIMADHOPUR	0	0
TONK	1	0
UDAIPUR	0	0
Total	44	1

(f) Madhya Pradesh

District	15 Sep – 04 Oct				
	2020	2021			
			PANNA	0	0
ALIRAJPUR	0	0	RAISEN	0	0
ANUPPUR	0	0	RAJGARH	1	0
ASHOKNAGAR	5	0	RATLAM	0	0
BALAGHAT	0	0	REWA	0	0
BARWANI	0	0	SAGAR	2	2
BETUL	0	0	SATNA	1	0
BHIND	0	0	SEHORE	1	0
BHOPAL	1	0	SEONI	0	0
BURHANPUR	0	0	SHAHDOL	0	0
CHHATARPUR	1	0	SHAJAPUR	2	0
CHHINDWARA	0	0	SHEOPUR	0	0
DAMOH	5	0	SHIVPURI	0	0
DATIA	1	0	SIDHI	0	0
DEWAS	0	0	SINGRAULI	0	0
DHAR	4	0	TIKAMGARH	0	0
DINDORI	0	0	UJJAIN	3	0
EAST NIMAR	0	0	UMARIA	0	0
GUNA	5	1	VIDESHA	5	1
GWALIOR	3	0	WEST NIMAR	0	0
HARDA	5	4	Total	47	8
HOSHANGABAD	0	0			
INDORE	1	0			
JABALPUR	1	0			
JHABUA	0	0			
KATNI	0	0			
MANDLA	0	0			
MANDSAUR	0	0			
MORENA	0	0			
NARSHIMAPURA	0	0			
NIMACH	0	0			

State-wise and date-wise number of paddy residue burning events detected in 2020 and 2021
(Period: 15 September - 04 October)

Number of Paddy Residue Burning Events Detected												
	Punjab		Haryana		Uttar Pradesh		Delhi		Rajasthan		Madhya Pradesh	
	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021
15-Sep	5	0	2	0	1	0	0	0	1	0	2	0
16-Sep	0	2	1	0	0	0	0	0	0	0	0	0
17-Sep	5	0	3	0	0	0	0	0	0	0	0	0
18-Sep	17	9	0	0	0	1	0	0	0	0	0	0
19-Sep	30	5	2	0	0	1	0	0	0	0	0	0
20-Sep	67	8	6	0	2	0	0	0	0	0	0	0
21-Sep	54	0	2	0	1	0	0	0	1	0	2	0
22-Sep	34	0	1	0	1	0	0	0	0	0	0	0
23-Sep	49	0	0	0	1	0	0	0	1	0	0	0
24-Sep	78	5	0	0	1	1	0	0	0	0	0	0
25-Sep	184	11	11	0	5	0	0	0	1	0	0	0
26-Sep	190	19	5	0	8	0	0	0	1	0	2	0
27-Sep	78	37	8	0	4	1	0	0	0	0	1	0
28-Sep	55	28	6	1	1	6	0	0	0	0	1	1
29-Sep	63	64	9	4	6	10	0	0	3	0	0	4
30-Sep	116	27	22	2	13	13	1	0	1	0	5	0
01-Oct	165	13	15	4	7	13	0	0	4	1	13	0
02-Oct	141	0	30	2	12	0	1	0	7	0	12	0
03-Oct	110	9	8	6	4	3	0	0	9	0	5	1
04-Oct	162	23	29	2	8	0	0	0	15	0	4	2
Total	1603	260	160	21	75	49	2	0	44	1	47	8

Details of residue burning events in Punjab on 04-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	AMRITSAR	RAYYA	S-NPP	31.63870	75.22910	10/4/2021	13:29:19	D	4.10
2	AMRITSAR	RAYYA	S-NPP	31.64020	75.21630	10/4/2021	13:29:19	D	2.10
3	AMRITSAR	TARSIKKA	S-NPP	31.63100	75.15590	10/4/2021	13:29:19	D	4.40
4	FATEHGARH SAHIB	KHAMANON	S-NPP	30.83380	76.32560	10/4/2021	13:29:19	D	4.70
5	FIROZPUR	GHALL KHURD	S-NPP	30.99730	74.75910	10/4/2021	13:29:19	D	2.60
6	FIROZPUR	MAMDOT	S-NPP	30.79470	74.38180	10/4/2021	13:29:19	D	12.50
7	JALANDHAR	LOHIAN	S-NPP	31.10050	75.18440	10/4/2021	13:29:19	D	3.40
8	JALANDHAR	LOHIAN	S-NPP	31.14120	75.14310	10/4/2021	13:29:19	D	5.20
9	JALANDHAR	MEHATPUR	S-NPP	30.98430	75.44730	10/4/2021	13:29:19	D	4.00
10	JALANDHAR	MEHATPUR	S-NPP	30.99870	75.45270	10/4/2021	13:29:19	D	4.40
11	LUDHIANA	MACHHIWARA	S-NPP	30.82080	76.23630	10/4/2021	13:29:19	D	2.80
12	LUDHIANA	MACHHIWARA	S-NPP	30.83430	76.25870	10/4/2021	13:29:19	D	2.10
13	LUDHIANA	MACHHIWARA	S-NPP	30.84000	76.27430	10/4/2021	13:29:19	D	3.60
14	LUDHIANA	MACHHIWARA	S-NPP	30.84840	76.28520	10/4/2021	13:29:19	D	5.30
15	LUDHIANA	MACHHIWARA	S-NPP	30.88220	76.31640	10/4/2021	13:29:19	D	2.90
16	LUDHIANA	SAMRALA	S-NPP	30.82020	76.23220	10/4/2021	13:29:19	D	2.80
17	LUDHIANA	SAMRALA	S-NPP	30.82360	76.23160	10/4/2021	13:29:19	D	2.80
18	LUDHIANA	SAMRALA	S-NPP	30.82690	76.23090	10/4/2021	13:29:19	D	3.80
19	RUPNAGAR	CHAMKAUR SAHIB	S-NPP	30.88280	76.32050	10/4/2021	13:29:19	D	2.30
20	SANGRUR	BHAWANIGARH	S-NPP	30.31680	76.14570	10/4/2021	13:29:19	D	5.90
21	TARN TARAN	GANDIWIND TATLA	S-NPP	31.52540	74.79960	10/4/2021	13:29:19	D	15.90
22	TARN TARAN	TARN TARAN	S-NPP	31.48800	74.99420	10/4/2021	13:29:19	D	1.90
23	TARN TARAN	TARN TARAN	S-NPP	31.50630	74.86990	10/4/2021	13:29:19	D	2.40

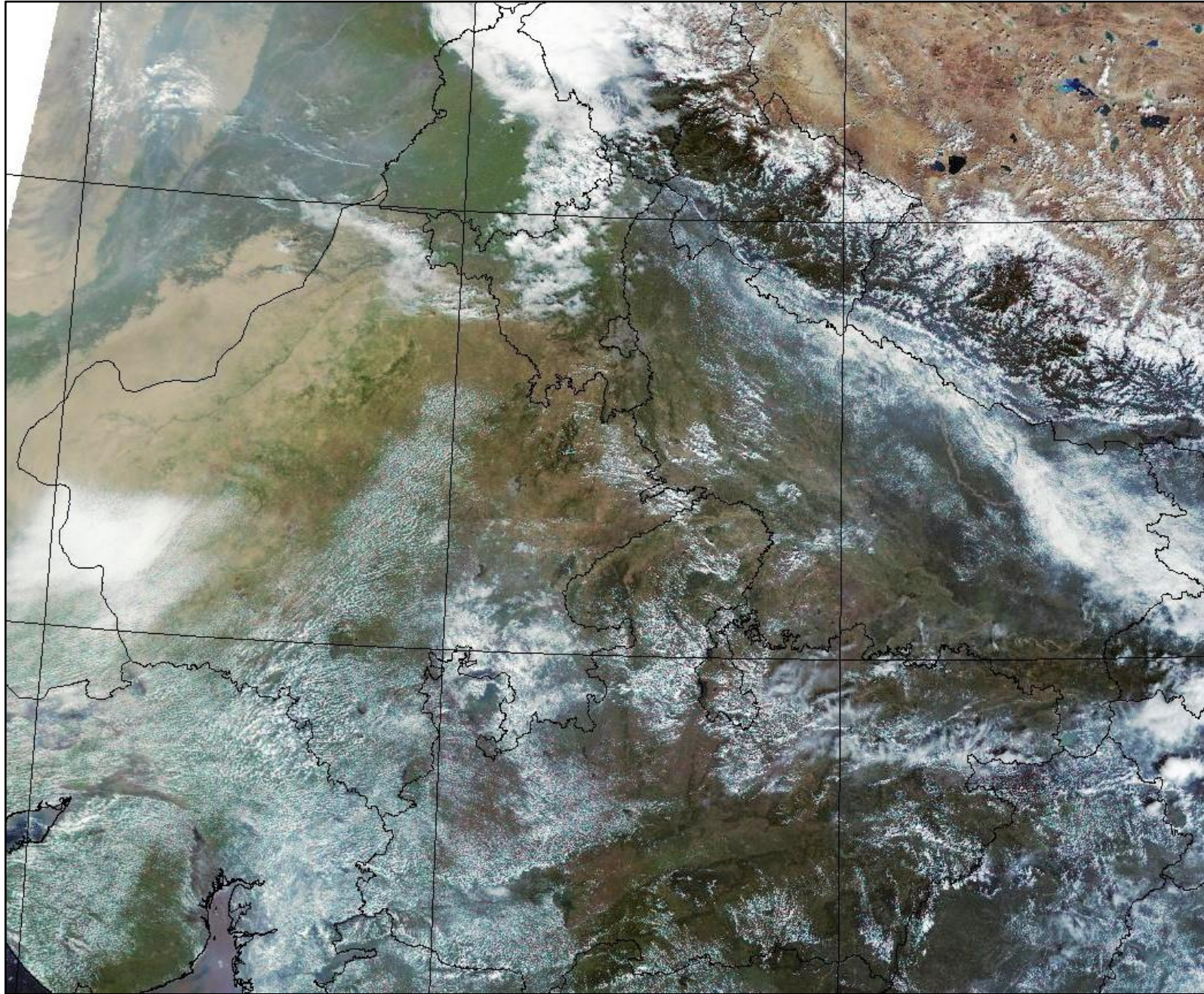
Details of residue burning events in Haryana on 04-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	KURUKSHETRA	LADWA	S-NPP	29.98820	77.07210	10/4/2021	13:29:19	D	4.20
2	SONIPAT	MUNDLANA	S-NPP	29.25450	76.69440	10/4/2021	13:29:19	D	3.30

Details of residue burning events in Madhya Pradesh on 04-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	HARDA	HARDA	S-NPP	22.14140	77.17610	10/4/2021	13:29:19	D	2.30
2	HARDA	KHIRKIYAN	S-NPP	22.27430	76.96080	10/4/2021	13:29:19	D	1.90

TERRA (MODIS) Satellite image (FCC) of North and Central India Acquired on 04-Oct-2021 at 10:43:50 IST by IARI Ground Station



The study used data received from following Satellites at NRSC Ground Station

S. No.	Satellite Name	Sensor	Resolution (meter)	Day / Night Passes
1.	Suomi NPP	VIIRS	375 / 750	Both
2.	Terra	MODIS	1000	Both
3.	Aqua	MODIS	1000	Both

**The rice mask for the Punjab and Haryana were provided by MNCFC, MoA&FW, Govt of India
The kharif crop mask for Delhi, Uttar Pradesh, Rajasthan and Madhya Pradesh were provided by NRSC**

Study Team

ICAR – HQ	Dr S.K. Chaudhari	DDG (AG. ENGG.)	ddgengg@icar.org.in
	Dr S. Bhasker	ADG (NRM)	adgagroandaf@gmail.com
	Dr K.K. Singh	ADG (AG. ENGG.)	kanchansingh044@gmail.com
ICAR - IARI	Dr V.K. Sehgal	Professor & Nodal Scientist	iaricreams@gmail.com
	Dr Rajkumar Dhakar	Scientist	raidhakar.iari@gmail.com
	Mr Mohd Jahangir	Lab Assistant (KRISHI)	mjahangir198@gmail.com
ICAR - ATARI	Dr Rajbir Singh	Director ATARI (Zone-I) Ludhiana	rajbirsingh.zpd@gmail.com
	Dr S.K. Singh	Director ATARI (Zone-II) Jodhpur	sushilsinghiipr@yahoo.co.in
	Dr Atar Singh	Director ATARI (Zone-III) Kanpur	zpdicarkanpur@gmail.com
ICAR - IASRI	Dr Rajender Parsad	Director	rajender.parsad@icar.gov.in

GIS Maps of fire events can be visualized online on ICAR KRISHI Geoportal website: <http://geoportal.icar.gov.in:8080/geoexplorer/composer/>
(Part of KRISHI Portal: <https://krishi.icar.gov.in> initiative)
