



**Bulletin
No. 33**

**Events Date:
17-Oct-2021**

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17-Oct-2021**



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



Prepared by:

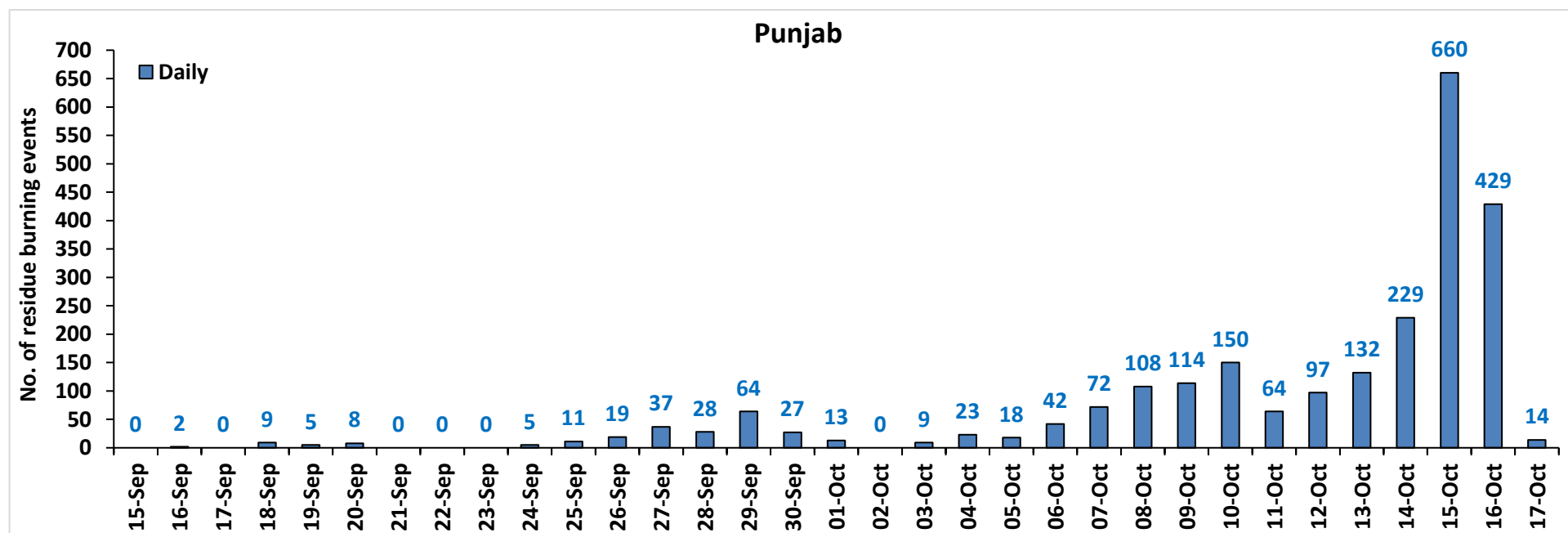
**Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012**

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

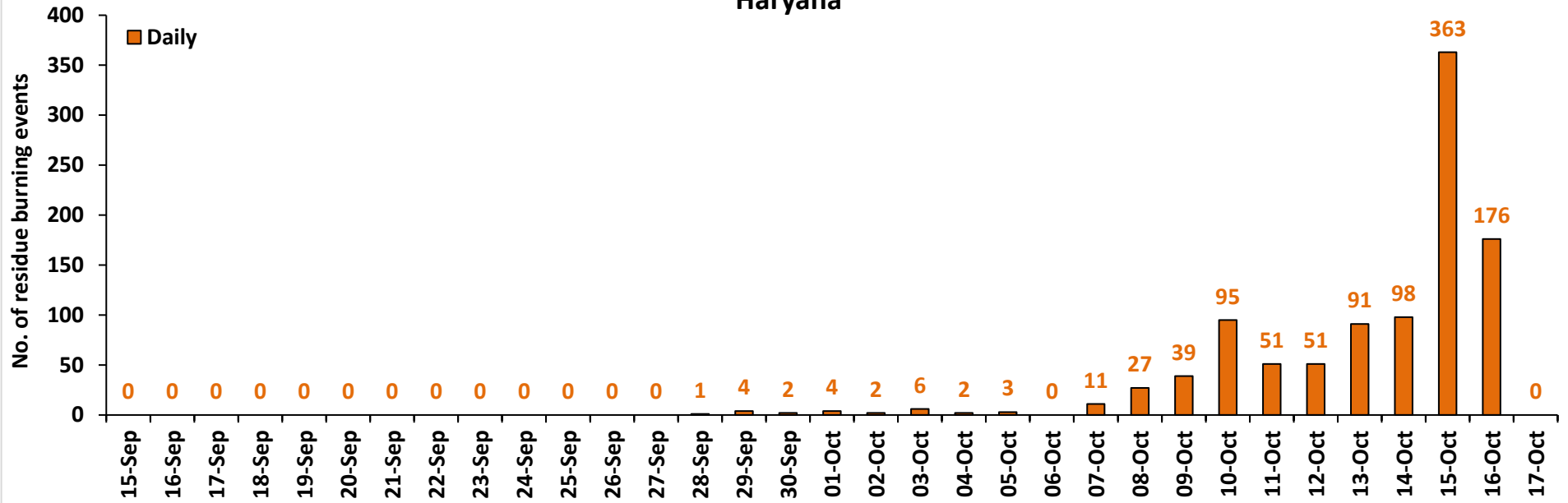
Highlights for 17-October-2021

- 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 **54** residue burning events in the six study States on 17-Oct-2021.
- The state wise events detected on 17-Oct-2021 were **14** in Punjab, **0** in Haryana, **39** in UP, **0** in Delhi, **0** in Rajasthan and **1** in MP.
- The number of events has decreased from **741** on 16-Oct-2021 to **54** on 17-Oct-2021 in the six study states.
- Detection of burning events by satellites was hampered due to clouds over all the study states.
- Total **4146** burning events were detected in the six states between 15-Sept-2021 and 17-Oct-2021, which are distributed as **2389**, **1026**, **620**, **0**, **27** and **84** in Punjab, Haryana, UP, Delhi, Rajasthan and MP, respectively.
- Overall, the total burning events recorded in the six states are **50.7%** less than in 2020 till date. Punjab recorded **50.8%** reduction, Haryana recorded **10.9%** increase, UP recorded **63.6%** increase, Delhi recorded **100%** reduction, Rajasthan recorded **88.7%** reduction and MP recorded **78.1%** reduction, in the current season than in 2020.

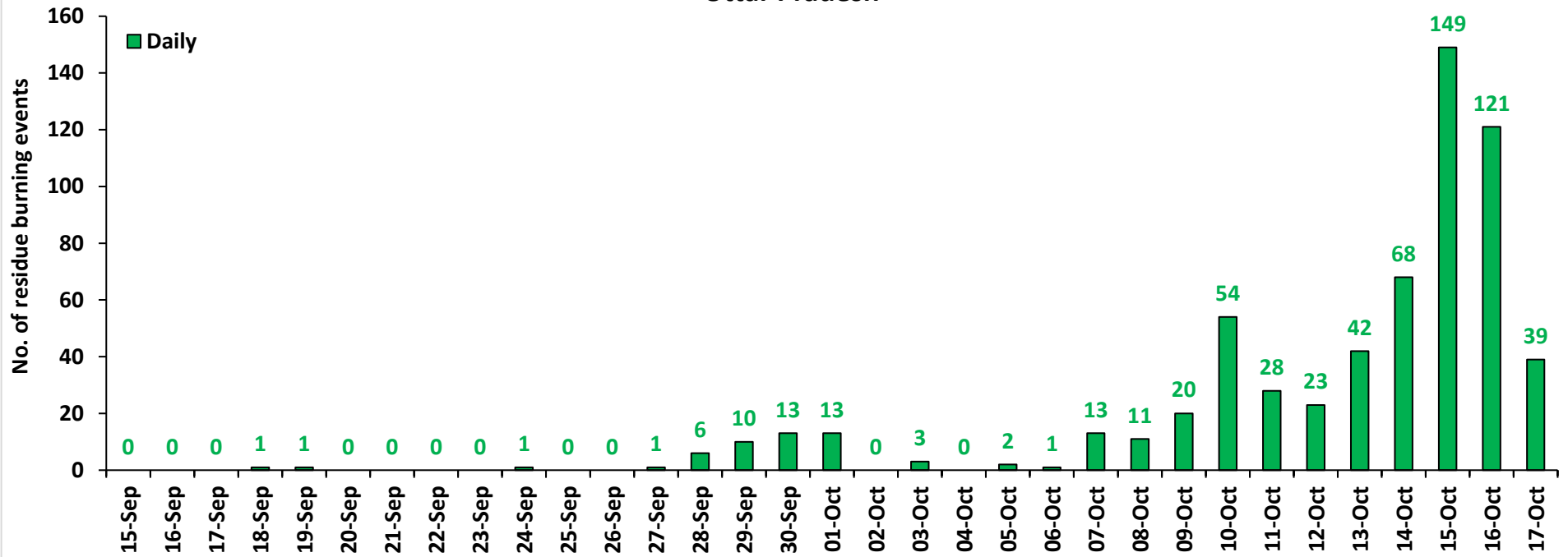
Temporal distribution of rice residue burning events for the study States in 2021



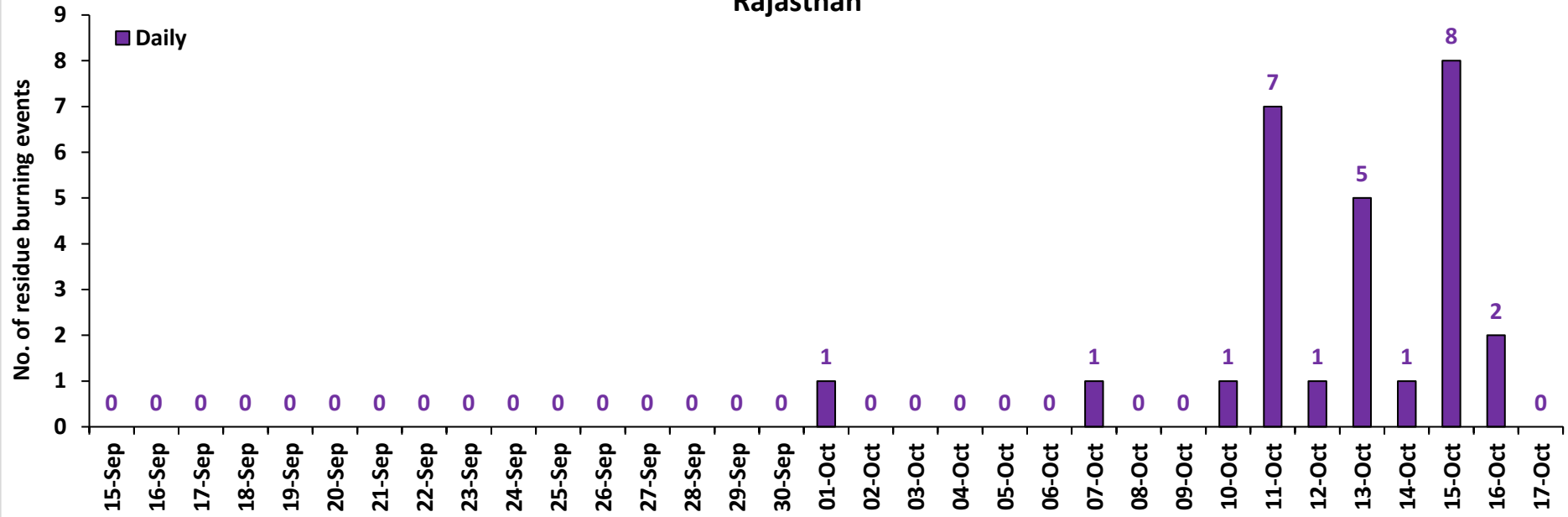
Haryana



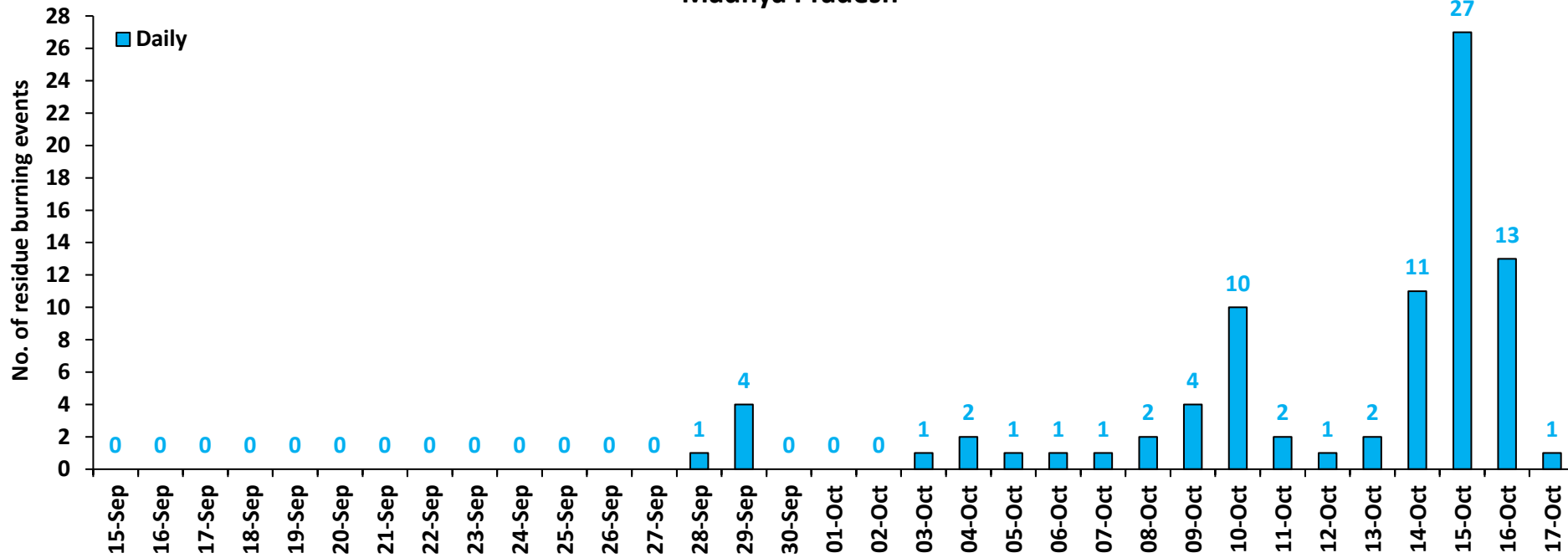
Uttar Pradesh



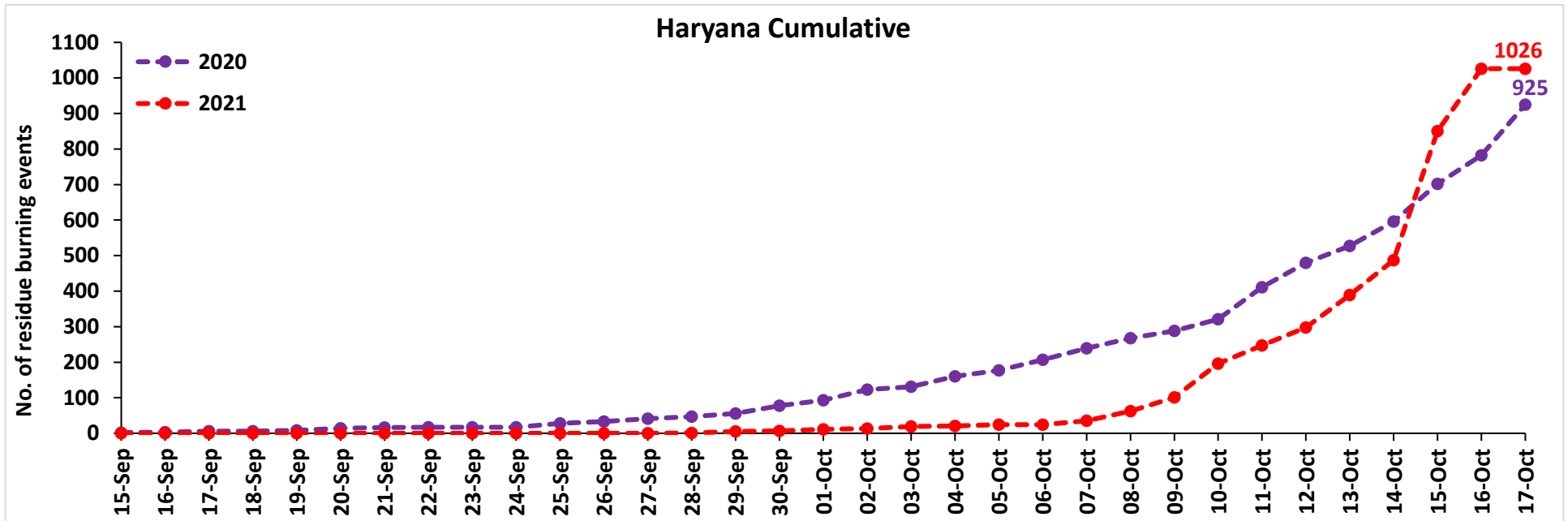
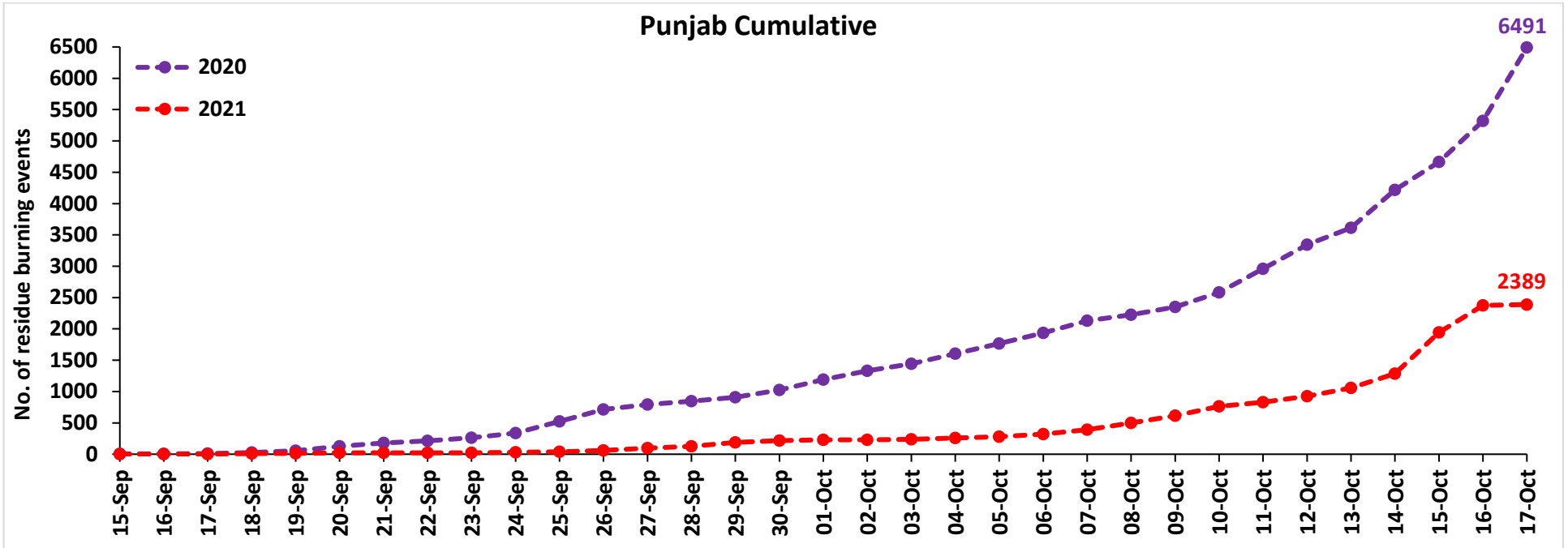
Rajasthan



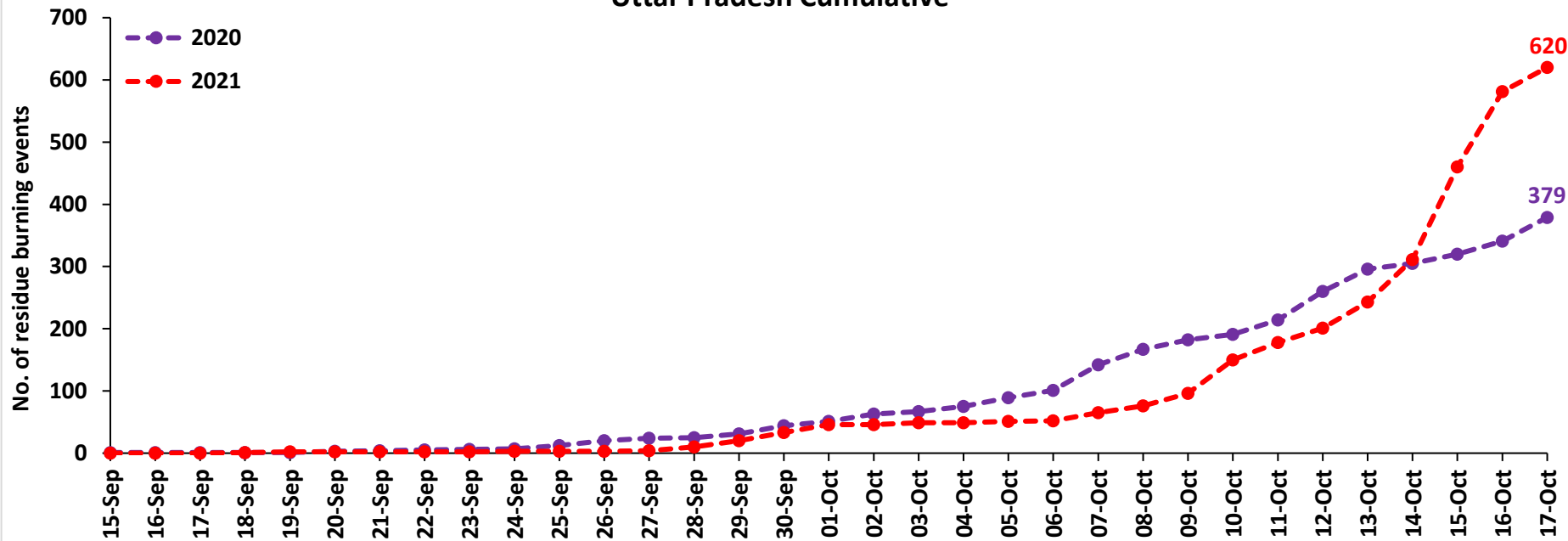
Madhya Pradesh



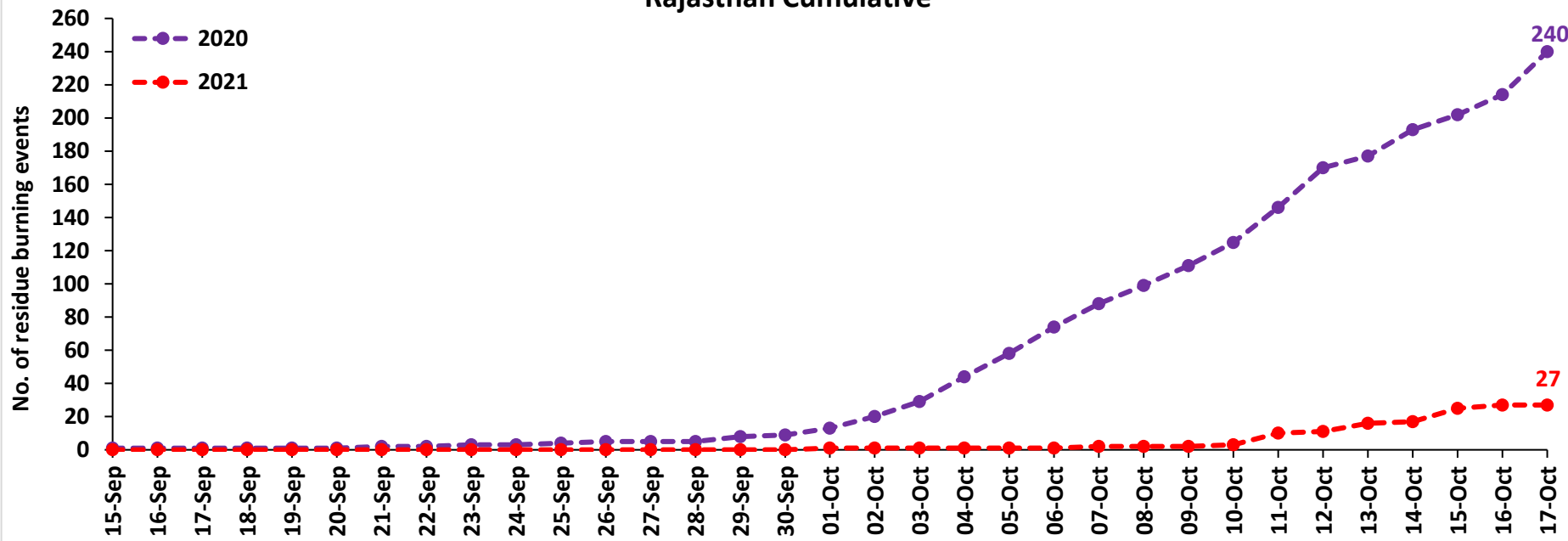
Comparison of residue burning events in current year (2021) with previous year (2020) for the study States

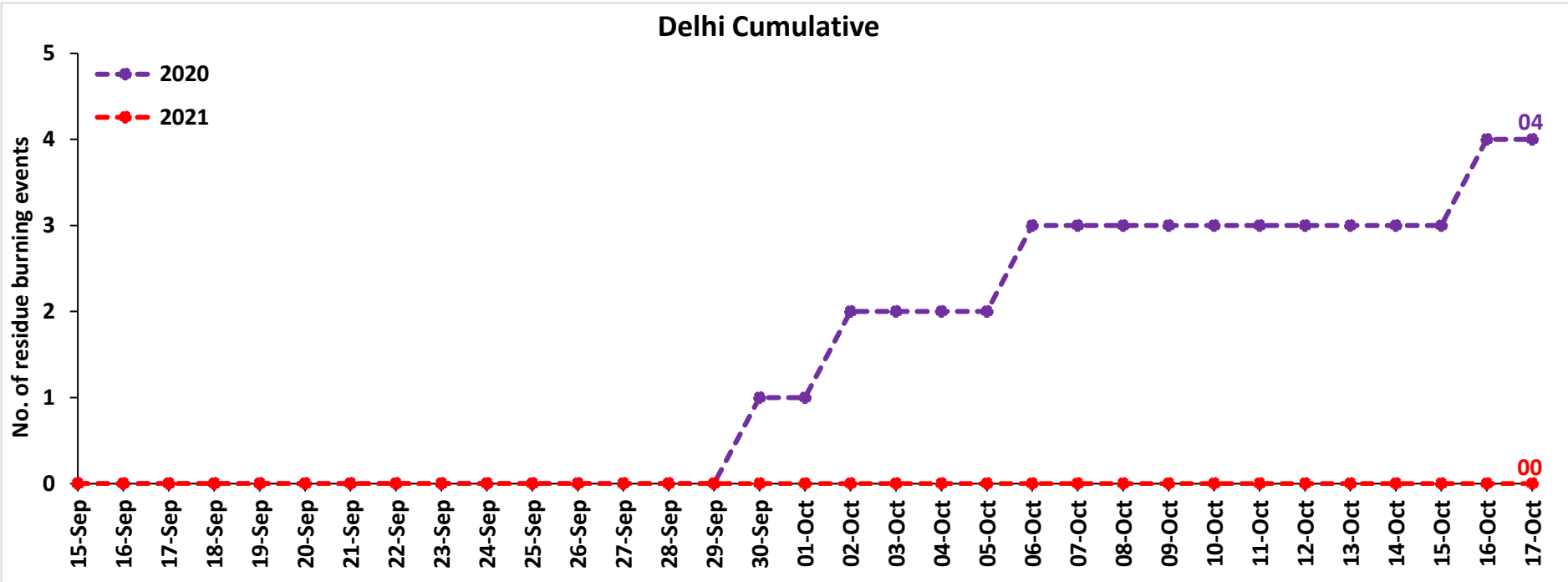
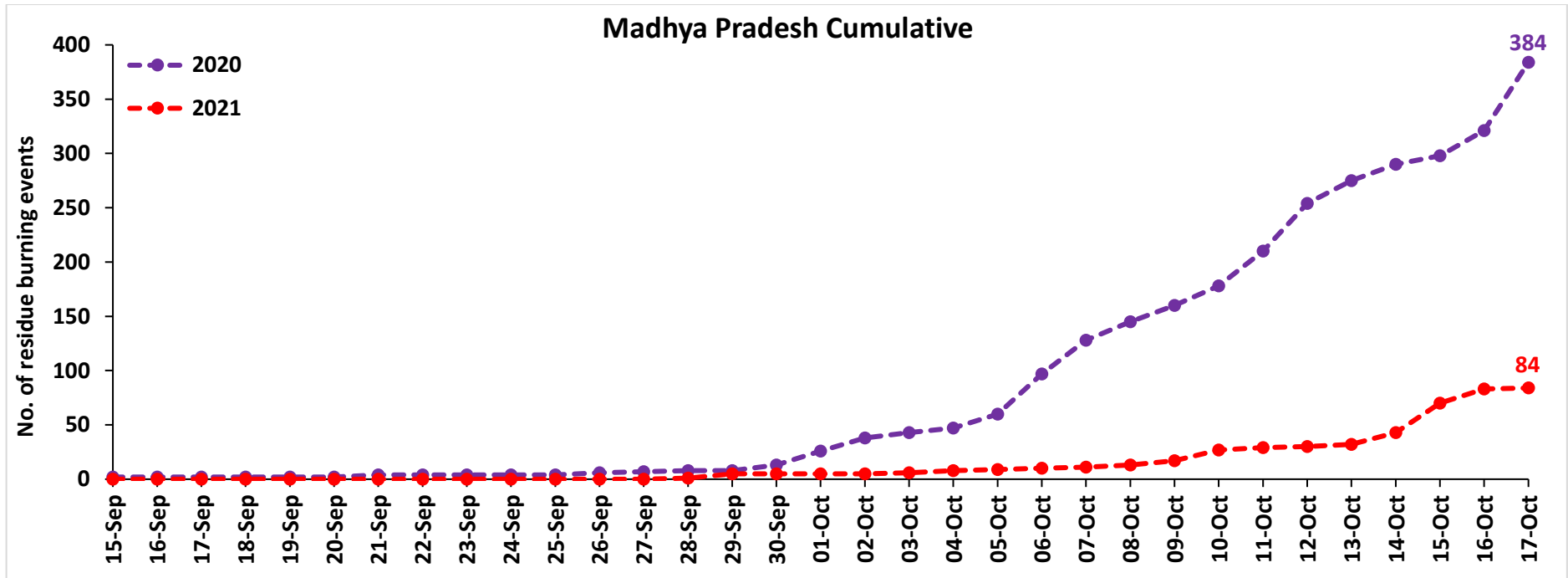


Uttar Pradesh Cumulative

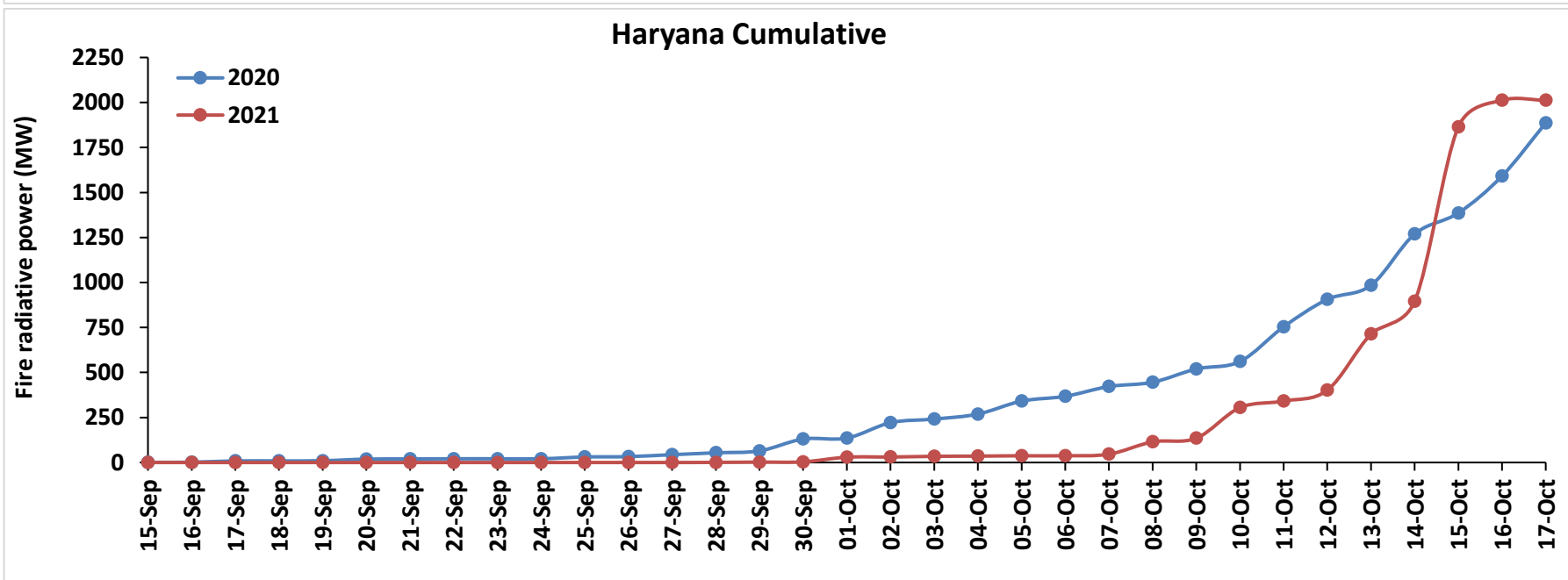
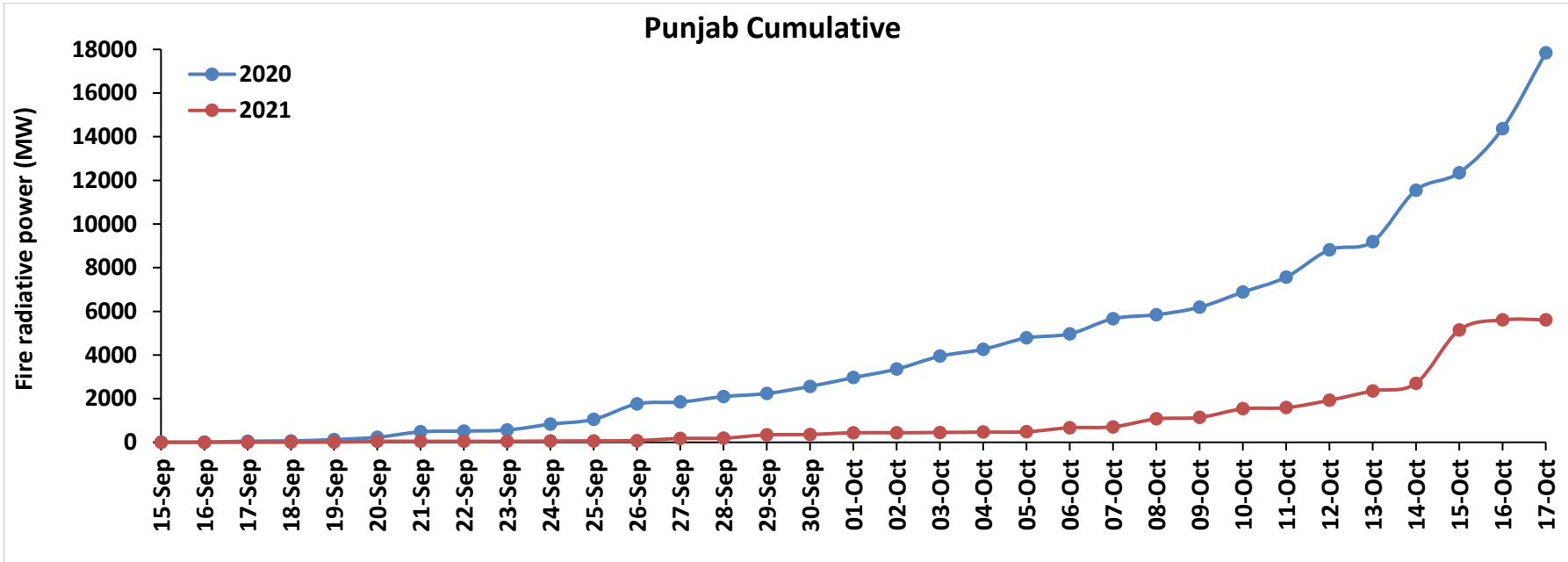


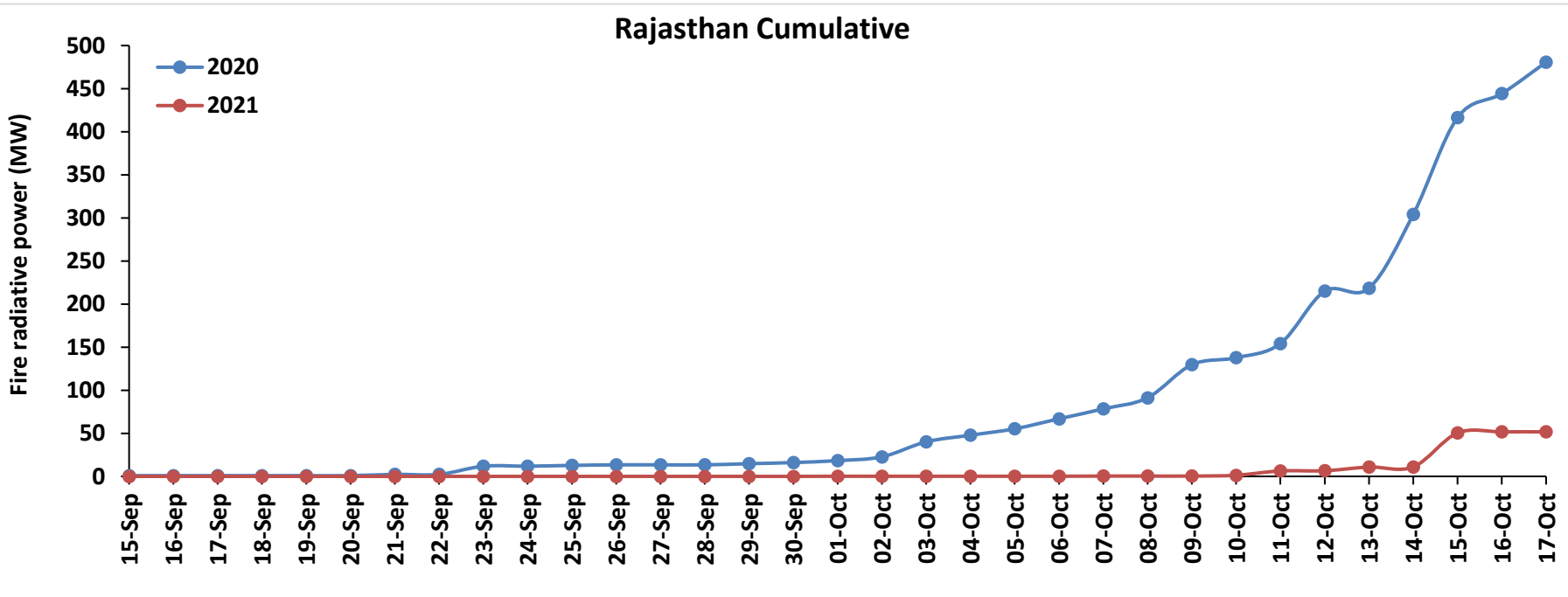
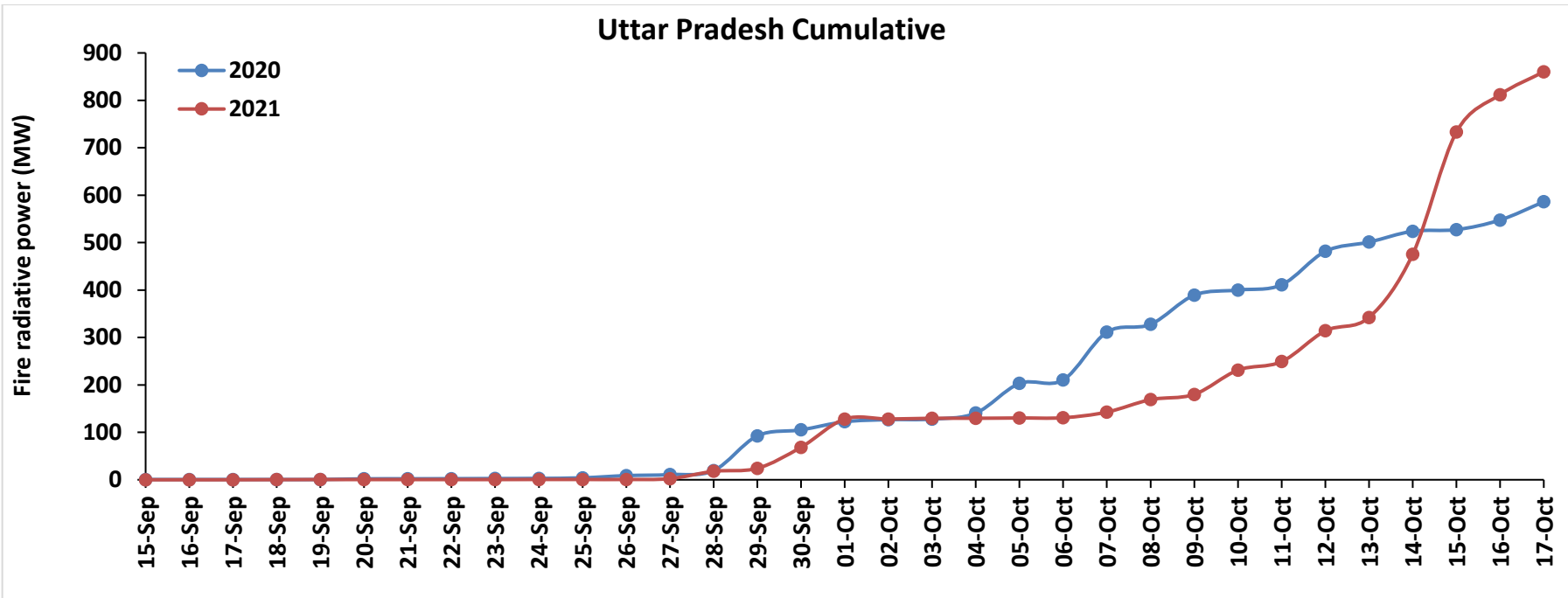
Rajasthan Cumulative



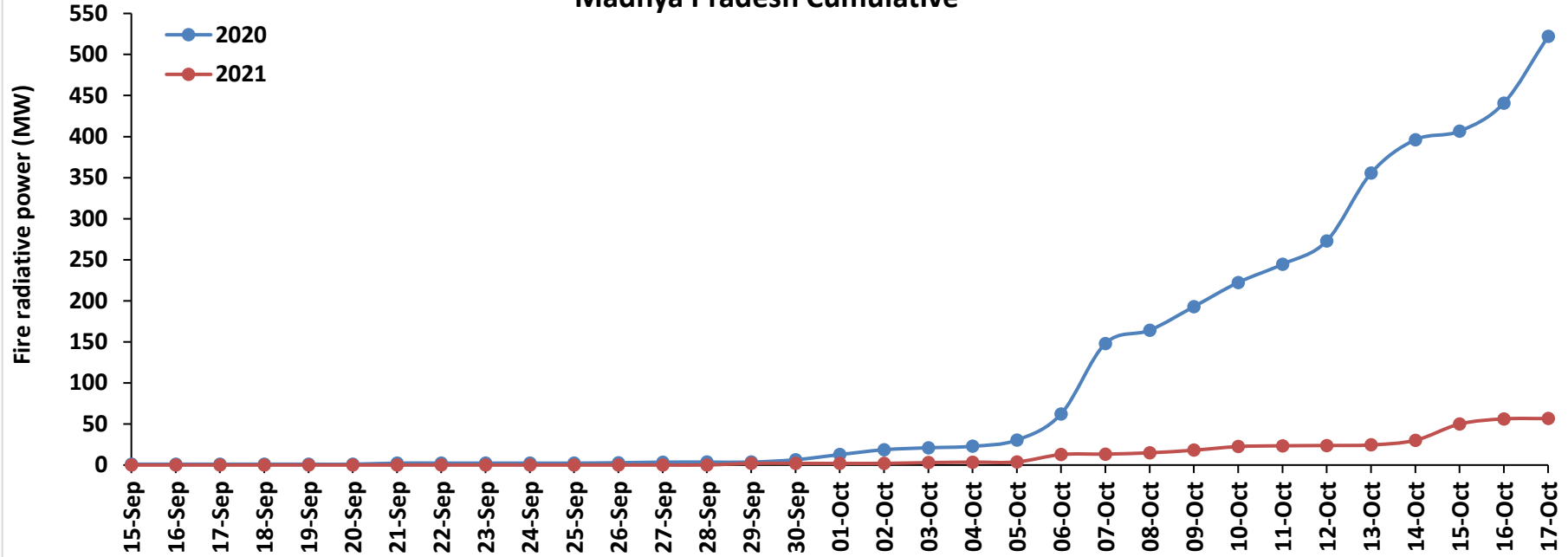


Comparison of residue burning fire power in current year (2021) with previous year (2020) for the study States

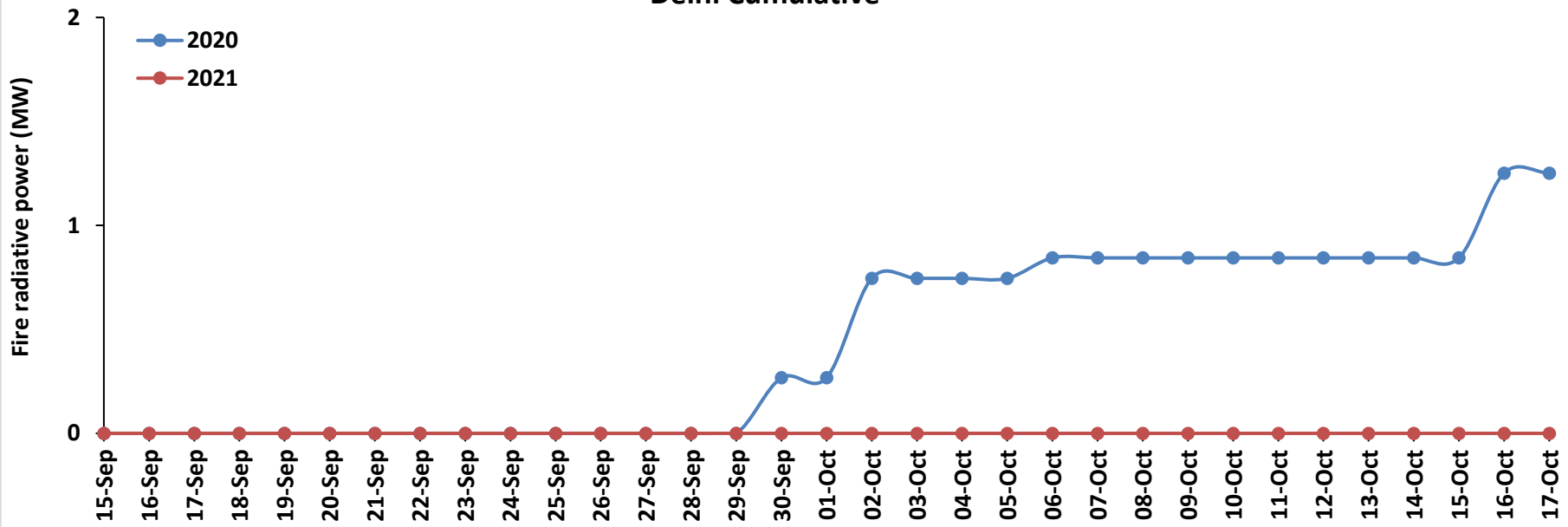




Madhya Pradesh Cumulative

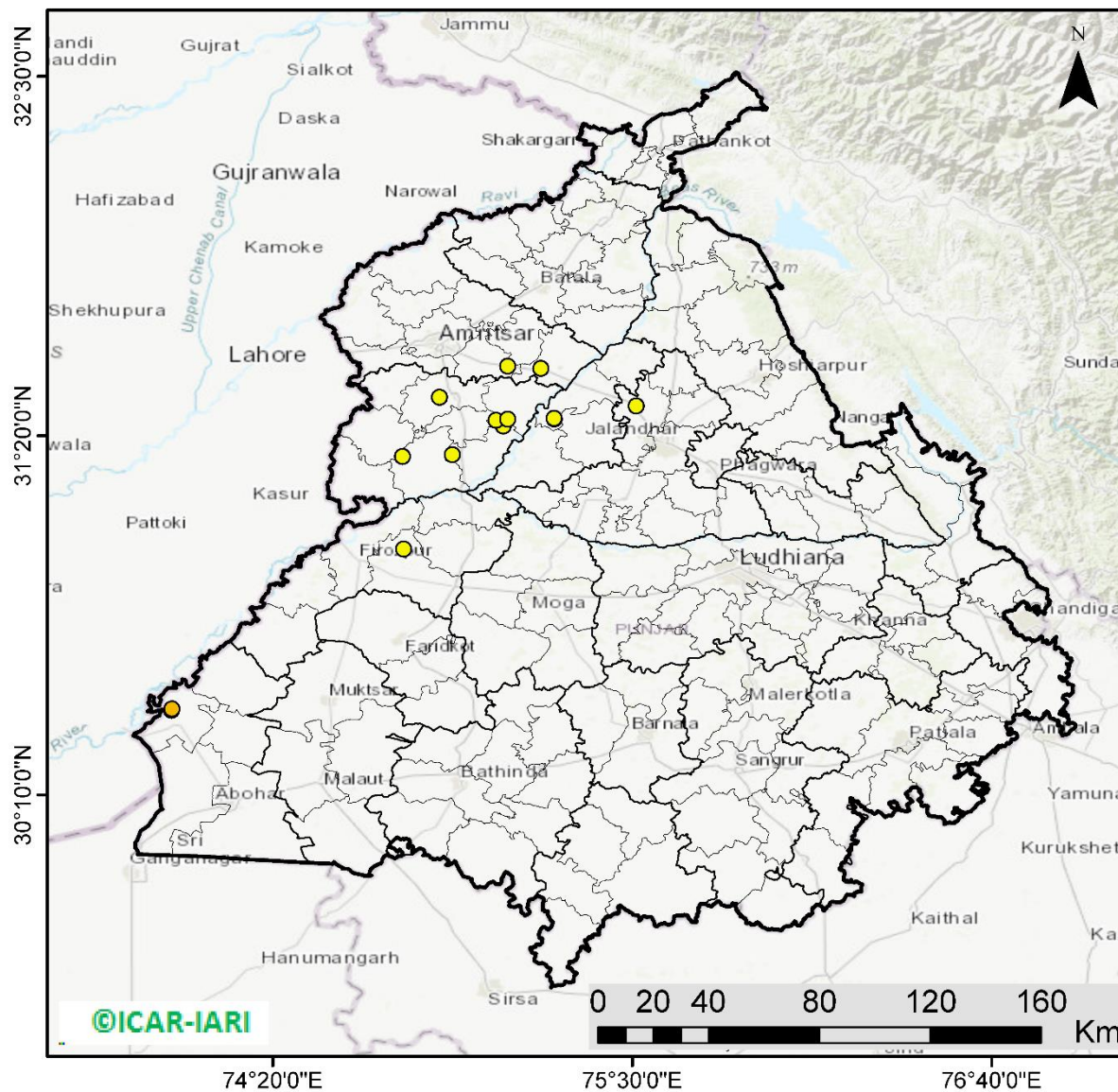


Delhi Cumulative



Punjab

RICE RESIDUE BURNING IN PUNJAB



14 burning events detected in Punjab on **17th October 2021**

Fire Intensity (W/m²)

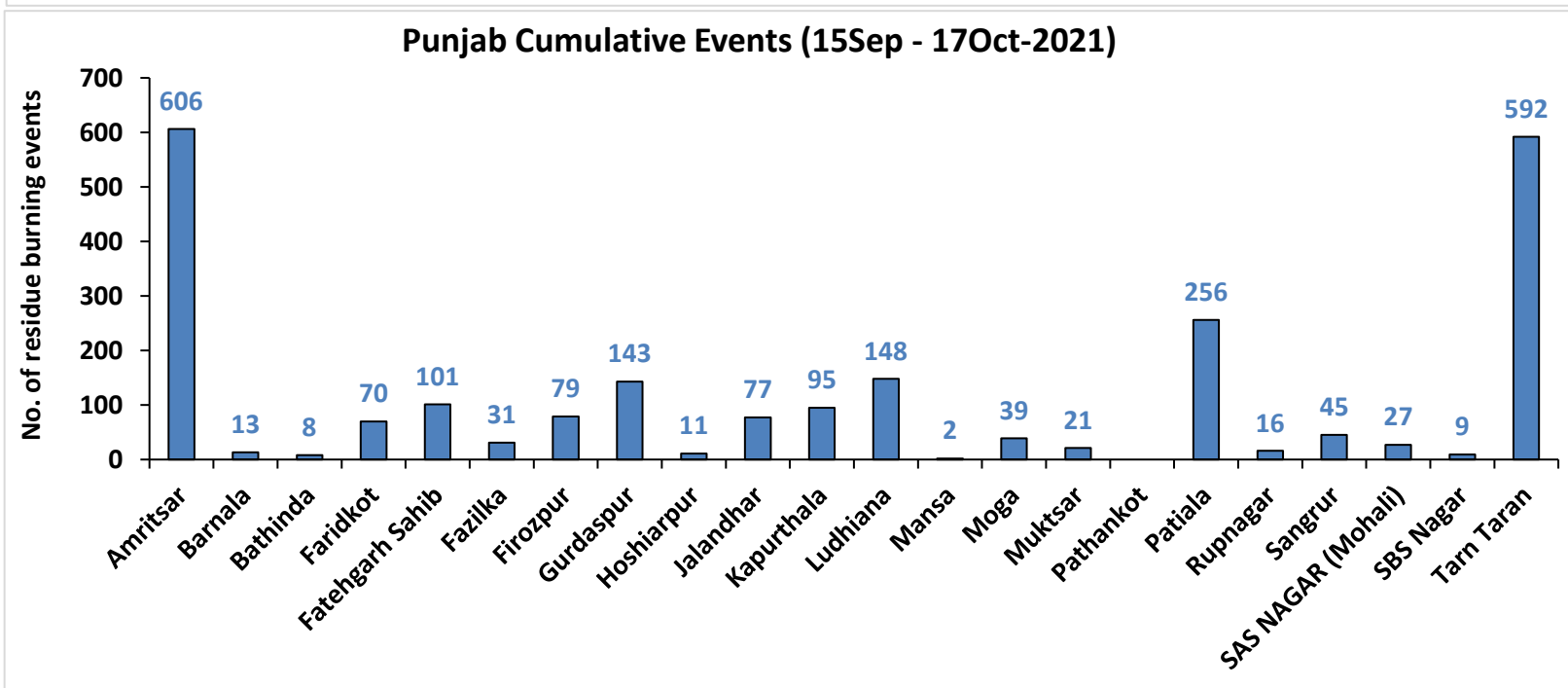
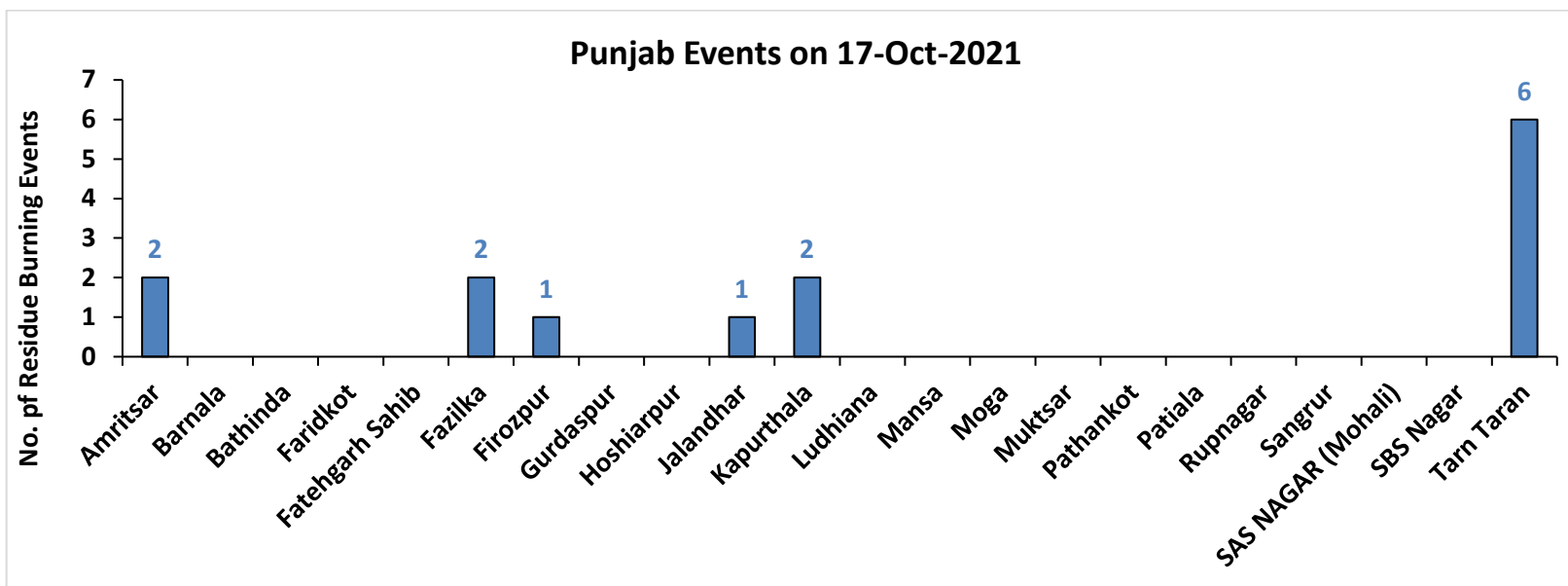
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



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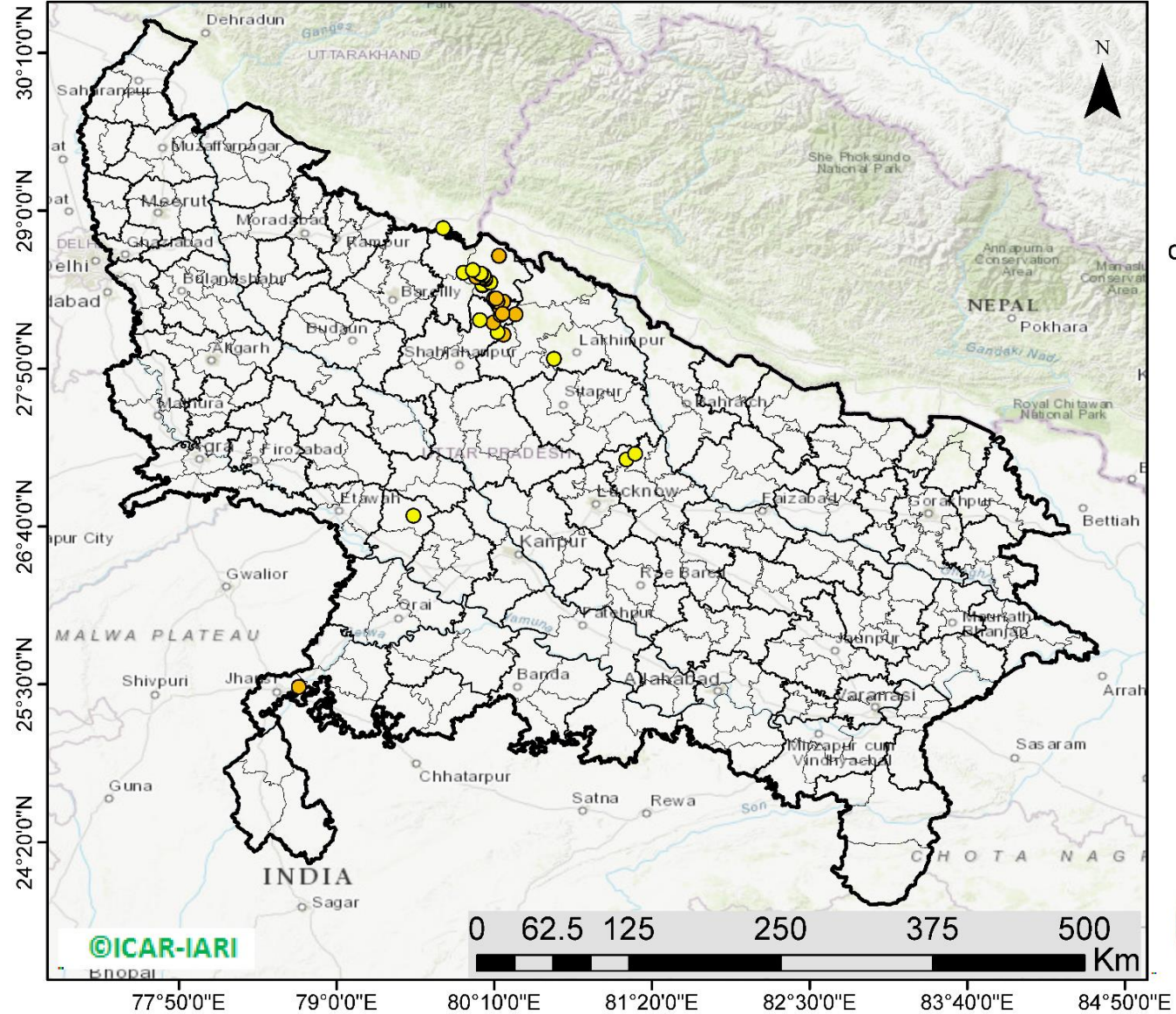
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Punjab (15Sep - 17Oct-2021)



Uttar Pradesh

RICE RESIDUE BURNING IN UTTAR PRADESH



39 burning events detected in Uttar Pradesh on 17th October 2021

Fire Intensity (W/m²)

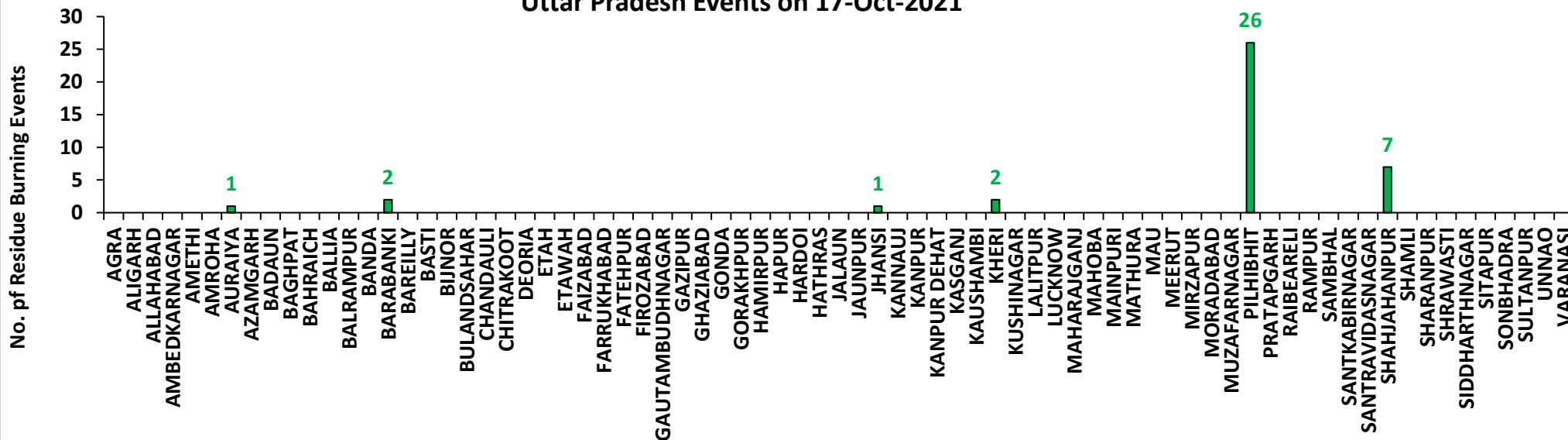
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



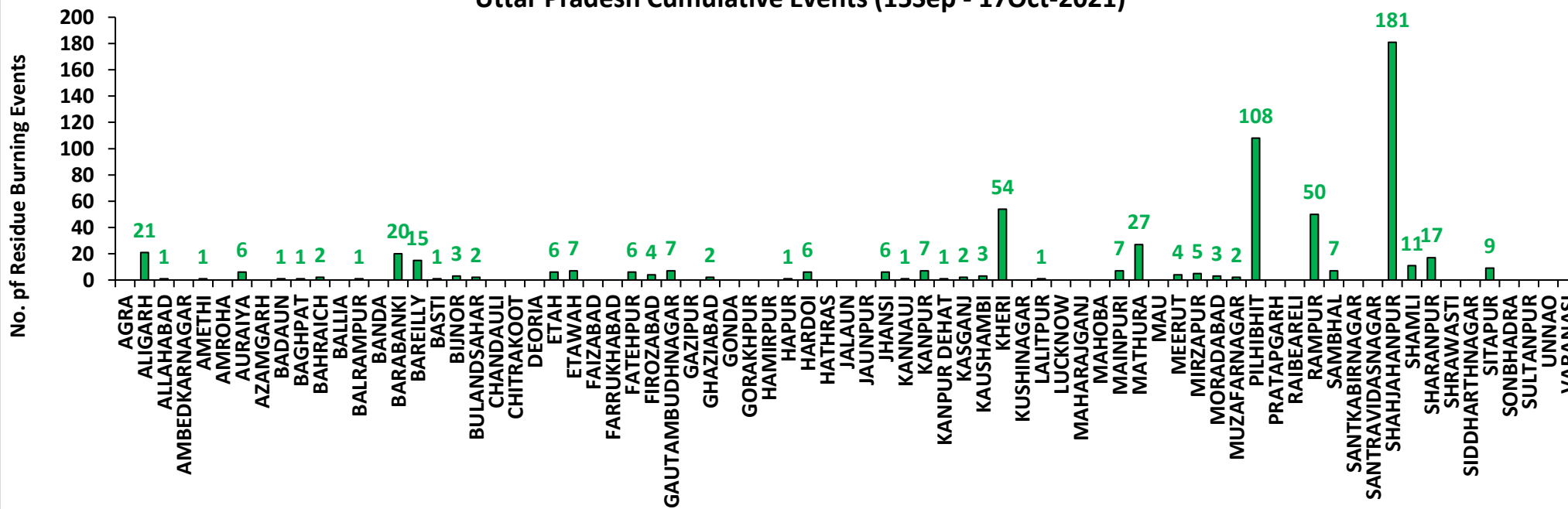
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District-wise cumulative number of residues burning events in Uttar Pradesh (15 Sep - 17 Oct-2021)

Uttar Pradesh Events on 17-Oct-2021

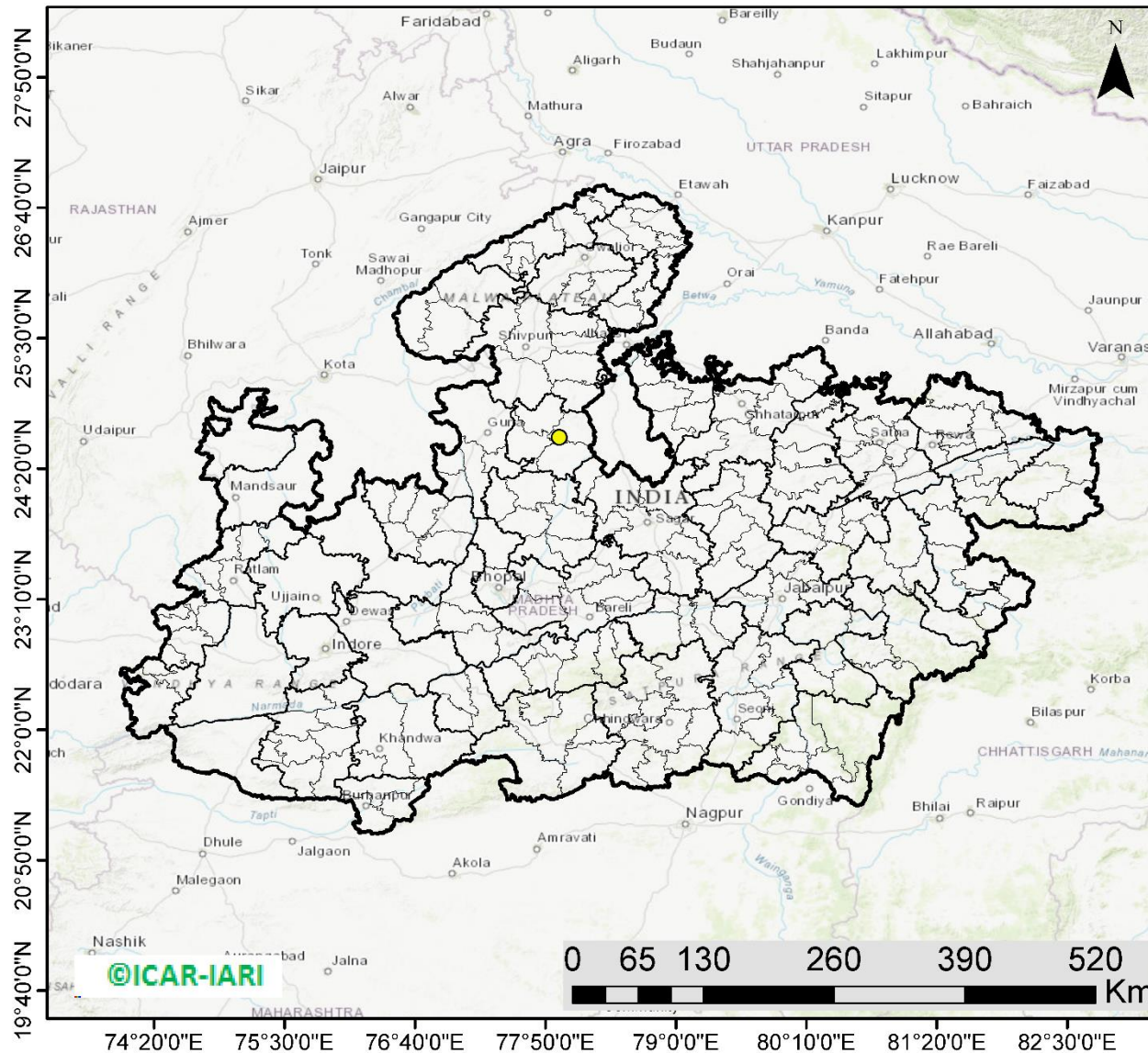


Uttar Pradesh Cumulative Events (15Sep - 17Oct-2021)



Madhya Pradesh

RICE RESIDUE BURNING IN MADHYA PRADESH



01 burning events detected in MP on 17th October 2021

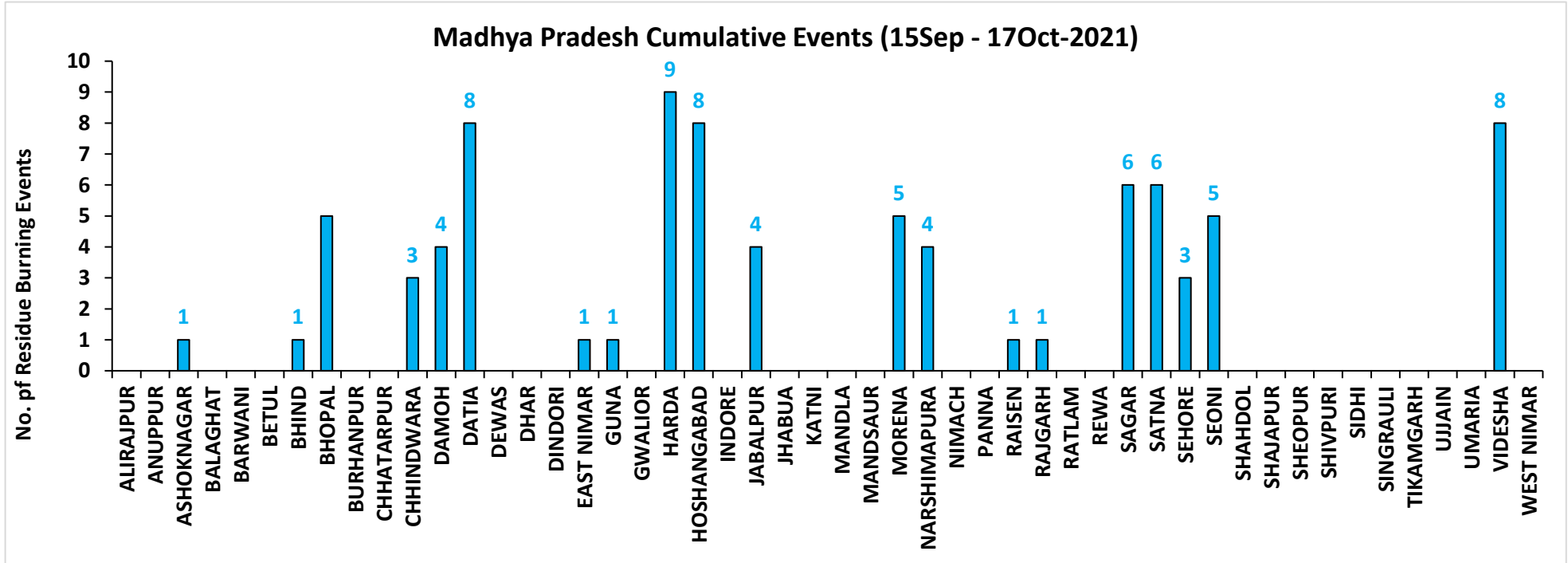
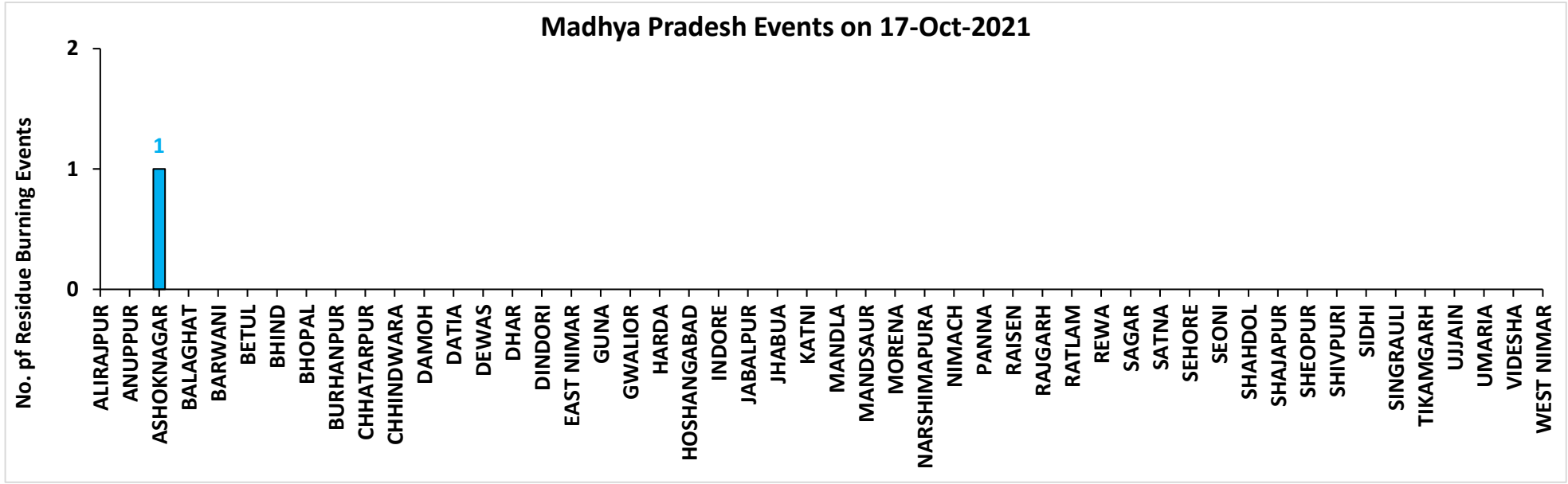
Fire Intensity (W/m²)

- 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 Madhya Pradesh (15 Sep - 17 Oct-2021)



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

(Period: 15 September - 17 October)

(a) Punjab

District	15 Sep – 17 Oct	
	2020	2021
AMRITSAR	1905	606
BARNALA	22	13
BATHINDA	69	8
FARIDKOT	214	70
FATEHGARH SAHIB	136	101
FAZILKA	52	31
FIROZPUR	485	79
GURDASPUR	460	143
HOSHIARPUR	52	11
JALANDHAR	115	77
KAPURTHALA	245	95
LUDHIANA	158	148
MANSA	51	2
MOGA	58	39
MUKTSAR	29	21
PATHANKOT	3	0
PATIALA	564	256
RUPNAGAR	29	16
SANGRUR	147	45
SAS NAGAR (MOHALI)	45	27
SBS NAGAR	12	9
TARN TARAN	1640	592
Total	6491	2389

(b) Haryana

District	15 Sep – 17 Oct	
	2020	2021
AMBALA	107	54
BHIWANI	0	0
CHARKHI DADRI	0	0
FARIDABAD	0	1
FATEHABAD	56	49
GURGAON	0	0
HISAR	6	1
JHAJJAR	1	0
JIND	29	30
KAITHAL	171	249
KARNAL	267	343
KURUKSHETRA	202	205
MAHENDRAGARH	0	0
MEWAT	0	0
PALWAL	11	25
PANCHKULA	0	0
PANIPAT	9	15
REWARI	0	0
ROHTAK	0	0
SIRSA	9	4
SONIPAT	11	5
YAMUNANAGAR	46	45
Total	925	1026

(c) Uttar Pradesh

District	15 Sep – 17 Oct							
	2020	2021						
			GAUTAMBUDHNAGAR	2	7	MUZAFARNAGAR	3	2
AGRA	1	0	GAZIPUR	0	0	PILHIBHIT	8	108
ALIGARH	28	21	GHAZIABAD	3	2	PRATAPGARH	0	0
ALLAHABAD	0	1	GONDA	0	0	RAIBEARELI	1	0
AMBEDKARNAGAR	0	0	GORAKHPUR	0	0	RAMPUR	22	50
AMETHI	0	1	HAMIRPUR	1	0	SAMBHAL	6	7
AMROHA	1	0	HAPUR	3	1	SANTKABIRNAGAR	0	0
AURAIYA	17	6	HARDOI	9	6	SANTRAVIDASNAGAR	0	0
AZAMGARH	0	0	HATHRAS	0	0	SHAHJAHANPUR	37	181
BADAUN	1	1	JALAUN	0	0	SHAMLI	19	11
BAGHPAT	3	1	JAUNPUR	0	0	SHARANPUR	22	17
BAHRAICH	2	2	JHANSI	9	6	SHRAWASTI	2	0
BALLIA	0	0	KANNAUJ	3	1	SIDDHARTHANAGAR	0	0
BALRAMPUR	1	1	KANPUR	0	7	SITAPUR	9	9
BANDA	0	0	KANPUR DEHAT	6	1	SONBHADRA	0	0
BARABANKI	12	20	KASGANJ	1	2	SULTANPUR	0	0
BAREILLY	10	15	KAUSHAMBI	7	3	UNNAO	4	0
BASTI	2	1	KHERI	38	54	VARANASI	0	0
BIJNOR	4	3	KUSHINAGAR	0	0	Total	379	620
BULANDSAHAR	8	2	LALITPUR	0	1			
CHANDAULI	0	0	LUCKNOW	2	0			
CHITRAKOOT	0	0	MAHARAJGANJ	0	0			
DEORIA	0	0	MAHOBA	2	0			
ETAH	5	6	MAINPURI	6	7			
ETAWAH	2	7	MATHURA	16	27			
FAIZABAD	1	0	MAU	0	0			
FARRUKHABAD	0	0	MEERUT	11	4			
FATEHPUR	16	6	MIRZAPUR	5	5			
FIROZABAD	4	4	MORADABAD	4	3			

(d) Delhi

District	15 Sep – 17 Oct	
	2020	2021
CENTRAL	0	0
EAST	0	0
NEW DELHI	0	0
NORTH	2	0
NORTH EAST	0	0
NORTH WEST DELHI		
SHAHADRA	1	0
SOUTH	0	0
SOUTH EAST	1	0
SOUTH WEST DELHI	0	0
WEST DELHI	0	0
Total	4	0

(e) Rajasthan

District	15 Sep – 17 Oct	
	2020	2021
AJMER	0	0
ALWAR	1	0
BANSWARA	0	0
BARAN	82	0
BARMER	2	0
BHARATPUR	1	0
BHILWARA	2	0
BIKANER	1	0
BUNDI	5	0
CHITTAURGARH	0	2
CHURU	0	0
DAUSA	0	0
DHOLPUR	0	0
DUNGARPUR	0	0
GANGANAGAR	2	0
HANUMANGARH	100	24
JAIPUR	1	0
JAISELMER	2	0
JALOR	0	0
JHALAWAR	1	0
JHUNJHUNUN	1	0
JODHPUR	1	0
KARALI	1	0
KOTA	24	1
NAGPUR	0	0
PALI	1	0
PRATAPGARH	4	0
RAJSMAND	0	0
SIKAR	0	0
SIROHI	1	0
SWAIMADHOPUR	6	0
TONK	1	0
UDAIPUR	0	0
Total	240	27

(f) Madhya Pradesh

District	15 Sep – 17 Oct				
	2020	2021			
			PANNA	2	0
ALIRAJPUR	0	0	RAISEN	12	1
ANUPPUR	0	0	RAJGARH	7	1
ASHOKNAGAR	11	1	RATLAM	0	0
BALAGHAT	0	0	REWA	3	0
BARWANI	0	0	SAGAR	13	6
BETUL	0	0	SATNA	3	6
BHIND	6	1	SEHORE	5	3
BHOPAL	6	5	SEONI	15	5
BURHANPUR	0	0	SHAHDOL	0	0
CHHATARPUR	4	0	SHAJAPUR	5	0
CHHINDWARA	1	3	SHEOPUR	14	0
DAMOH	19	4	SHIVPURI	8	0
DATIA	50	8	SIDHI	0	0
DEWAS	3	0	SINGRAULI	0	0
DHAR	20	0	TIKAMGARH	1	0
DINDORI	0	0	UJJAIN	5	0
EAST NIMAR	2	1	UMARIA	0	0
GUNA	15	1	VIDESHA	55	8
GWALIOR	34	0	WEST NIMAR	6	0
HARDA	8	9	Total	384	84
HOSHANGABAD	20	8			
INDORE	2	0			
JABALPUR	7	4			
JHABUA	0	0			
KATNI	1	0			
MANDLA	0	0			
MANDSAUR	3	0			
MORENA	15	5			
NARSHIMAPURA	3	4			
NIMACH	0	0			

State-wise and date-wise number of paddy residue burning events detected in 2020 and 2021
(Period: 15 September – 17 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
05-Oct	161	18	17	3	14	2	0	0	14	0	13	1
06-Oct	171	42	30	0	12	1	1	0	16	0	37	1
07-Oct	197	72	32	11	41	13	0	0	14	1	31	1
08-Oct	95	108	29	27	25	11	0	0	11	0	17	2
09-Oct	121	114	20	39	15	20	0	0	12	0	15	4
10-Oct	232	150	33	95	9	54	0	0	14	1	18	10
11-Oct	377	64	90	51	23	28	0	0	21	7	32	2
12-Oct	388	97	69	51	46	23	0	0	24	1	44	1

13-Oct	266	132	47	91	36	42	0	0	7	5	21	2
14-Oct	605	229	69	98	9	68	0	0	16	1	15	11
15-Oct	449	660	106	363	15	149	0	0	9	8	8	27
16-Oct	654	429	80	176	21	121	1	0	12	2	23	13
17-Oct	1172	14	143	0	38	39	0	0	26	0	63	1
Total	6491	2389	925	1026	379	620	4	0	240	27	384	84

Details of residue burning events in Punjab on 17-Oct-2021

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	AMRITSAR	JANDIALA GURU	S-NPP	31.55890	75.09550	10/17/2021	12:46:02	D	3.70
2	AMRITSAR	RAYYA	S-NPP	31.55140	75.20330	10/17/2021	12:46:02	D	4.10
3	FAZILKA	FAZILKA	S-NPP	30.44150	74.00420	10/17/2021	14:25:37	D	5.40
4	FAZILKA	FAZILKA	S-NPP	30.44630	74.00540	10/17/2021	14:25:37	D	6.20
5	FIROZPUR	GHALL KHURD	S-NPP	30.96520	74.75760	10/17/2021	12:46:02	D	3.00
6	JALANDHAR	JALANDHAR WEST	S-NPP	31.42950	75.51320	10/17/2021	12:46:02	D	2.70
7	KAPURTHALA	DHILWAN	S-NPP	31.38740	75.24720	10/17/2021	12:46:02	D	3.40
8	KAPURTHALA	DHILWAN	S-NPP	31.38990	75.24640	10/17/2021	12:46:02	D	3.50
9	TARN TARAN	CHOHLA SAHIB	S-NPP	31.27180	74.91630	10/17/2021	12:46:02	D	3.50
10	TARN TARAN	CHOHLA SAHIB	S-NPP	31.36410	75.08120	10/17/2021	12:46:02	D	2.60
11	TARN TARAN	CHOHLA SAHIB	S-NPP	31.38280	75.05810	10/17/2021	12:46:02	D	3.90
12	TARN TARAN	CHOHLA SAHIB	S-NPP	31.38640	75.09540	10/17/2021	12:46:02	D	2.60
13	TARN TARAN	PATTI	S-NPP	31.26570	74.75400	10/17/2021	12:46:02	D	4.10
14	TARN TARAN	TARN TARAN	S-NPP	31.45830	74.87420	10/17/2021	12:46:02	D	4.50

Details of residue burning events in Uttar Pradesh on 17-Oct-2021

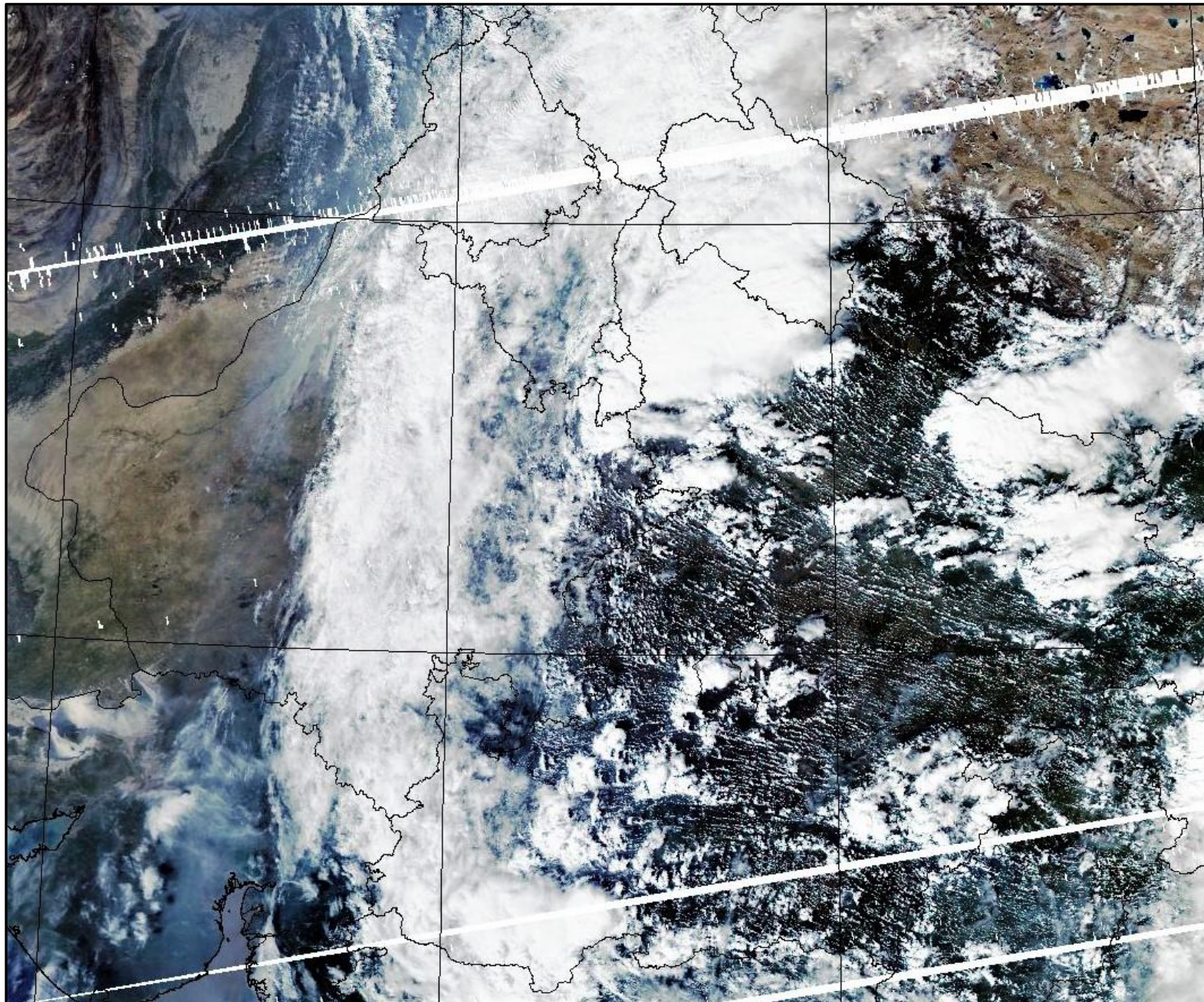
S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	AURAIYA	BIDHUNA	S-NPP	26.74680	79.56930	10/17/2021	01:36:02	N	0.60
2	BARABANKI	FATEHPUR	S-NPP	27.16130	81.14530	10/17/2021	12:46:02	D	3.80
3	BARABANKI	FATEHPUR	S-NPP	27.20420	81.20930	10/17/2021	12:46:02	D	5.00
4	JHANSI	JHANSI	S-NPP	25.48060	78.72040	10/17/2021	12:46:02	D	6.10
5	KHERI	GOLA	AQUA	28.23500	80.32500	10/17/2021	13:32:13	D	7.40
6	KHERI	LAKHIMPUR	S-NPP	27.90640	80.60970	10/17/2021	12:46:02	D	4.20
7	PILHIBHIT	PILHIBHIT	S-NPP	28.54250	79.93900	10/17/2021	12:46:02	D	2.80
8	PILHIBHIT	PILHIBHIT	S-NPP	28.87110	79.78840	10/17/2021	12:46:02	D	2.70
9	PILHIBHIT	PURANPUR	S-NPP	28.32730	80.18150	10/17/2021	12:46:02	D	5.70
10	PILHIBHIT	PURANPUR	S-NPP	28.32900	80.23390	10/17/2021	12:46:02	D	5.80
11	PILHIBHIT	PURANPUR	S-NPP	28.32910	80.19070	10/17/2021	12:46:02	D	7.40
12	PILHIBHIT	PURANPUR	S-NPP	28.34790	80.16310	10/17/2021	12:46:02	D	4.60
13	PILHIBHIT	PURANPUR	S-NPP	28.35310	80.16660	10/17/2021	12:46:02	D	5.40
14	PILHIBHIT	PURANPUR	S-NPP	28.44860	80.07980	10/17/2021	12:46:02	D	3.80
15	PILHIBHIT	PURANPUR	S-NPP	28.45290	80.07870	10/17/2021	12:46:02	D	3.80
16	PILHIBHIT	PURANPUR	S-NPP	28.46960	80.13730	10/17/2021	12:46:02	D	3.30
17	PILHIBHIT	PURANPUR	S-NPP	28.49370	80.10200	10/17/2021	12:46:02	D	7.60
18	PILHIBHIT	PURANPUR	S-NPP	28.49700	80.09630	10/17/2021	12:46:02	D	6.00
19	PILHIBHIT	PURANPUR	S-NPP	28.49790	80.10090	10/17/2021	12:46:02	D	6.20
20	PILHIBHIT	PURANPUR	S-NPP	28.50690	80.07910	10/17/2021	12:46:02	D	2.60
21	PILHIBHIT	PURANPUR	S-NPP	28.50790	80.03990	10/17/2021	12:46:02	D	6.20
22	PILHIBHIT	PURANPUR	S-NPP	28.50790	80.08370	10/17/2021	12:46:02	D	2.60
23	PILHIBHIT	PURANPUR	S-NPP	28.51120	80.03410	10/17/2021	12:46:02	D	7.50
24	PILHIBHIT	PURANPUR	S-NPP	28.52260	80.08960	10/17/2021	12:46:02	D	3.20
25	PILHIBHIT	PURANPUR	S-NPP	28.53160	80.06780	10/17/2021	12:46:02	D	5.90
26	PILHIBHIT	PURANPUR	S-NPP	28.53260	80.06410	10/17/2021	12:46:02	D	5.70
27	PILHIBHIT	PURANPUR	S-NPP	28.53360	80.06870	10/17/2021	12:46:02	D	5.70
28	PILHIBHIT	PURANPUR	S-NPP	28.53580	80.06670	10/17/2021	12:46:02	D	3.40
29	PILHIBHIT	PURANPUR	S-NPP	28.56140	80.00910	10/17/2021	01:36:02	N	3.90
30	PILHIBHIT	PURANPUR	S-NPP	28.66670	80.20310	10/17/2021	12:46:02	D	9.00

31	PILHIBHIT	PURANPUR	S-NPP	28.66830	80.20150	10/17/2021	12:46:02	D	9.00
32	PILHIBHIT	PURANPUR	AQUA	28.35200	80.18100	10/17/2021	13:32:13	D	8.00
33	SHAHJAHANPUR	PUWANYA	S-NPP	28.08400	80.23580	10/17/2021	12:46:02	D	5.90
34	SHAHJAHANPUR	PUWANYA	S-NPP	28.10210	80.19240	10/17/2021	12:46:02	D	3.20
35	SHAHJAHANPUR	PUWANYA	S-NPP	28.17370	80.16080	10/17/2021	12:46:02	D	6.10
36	SHAHJAHANPUR	PUWANYA	S-NPP	28.19220	80.06000	10/17/2021	01:36:02	N	3.50
37	SHAHJAHANPUR	PUWANYA	S-NPP	28.22950	80.21410	10/17/2021	12:46:02	D	3.80
38	SHAHJAHANPUR	PUWANYA	S-NPP	28.29510	80.19950	10/17/2021	12:46:02	D	5.10
39	SHAHJAHANPUR	PUWANYA	AQUA	28.23900	80.22800	10/17/2021	13:32:13	D	7.90

Details of residue burning events in Madhya Pradesh on 17-Oct-2021

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	ASHOKNAGAR	CHANDERI	S-NPP	24.61270	77.95650	10/17/2021	12:46:02	D	2.70

[AQUA \(MODIS\) Satellite image \(TCC\) of North and Central India Acquired on 17-Oct-2021 at 13:30:25 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**

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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)
