



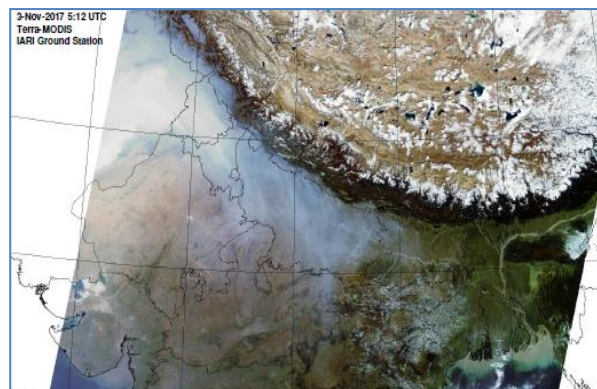
Bulletin No. 17

Events Date:
01-Oct-2021

Issued on:
01-Oct-2021



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



Prepared by:

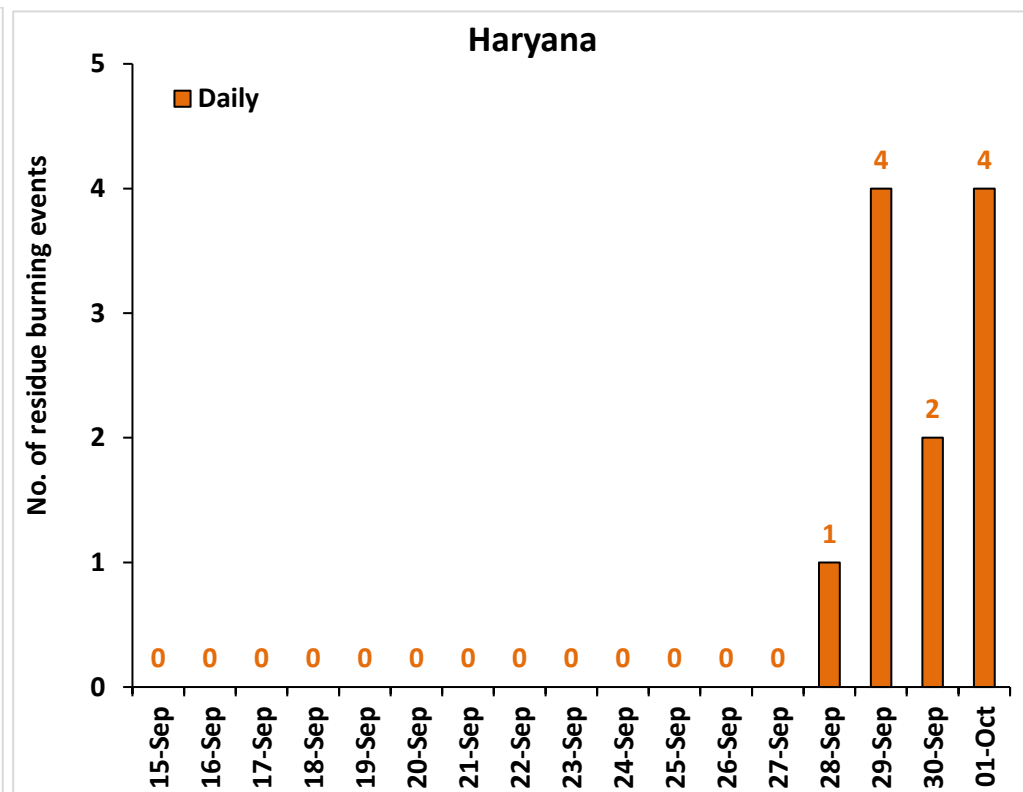
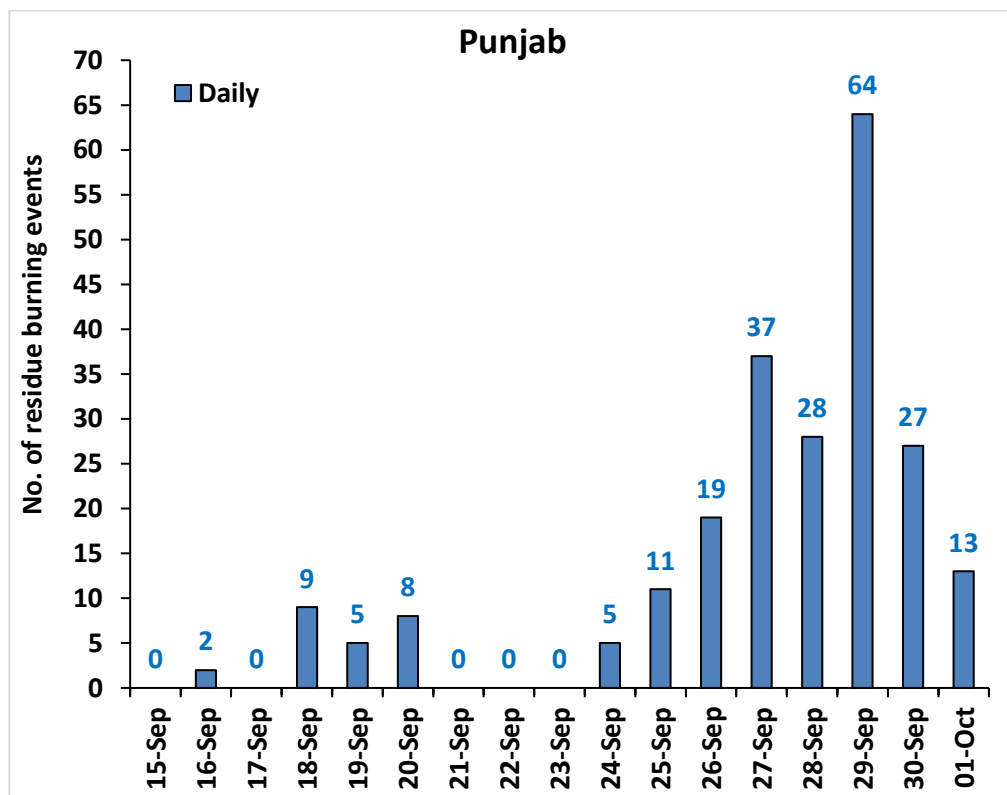
Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012

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

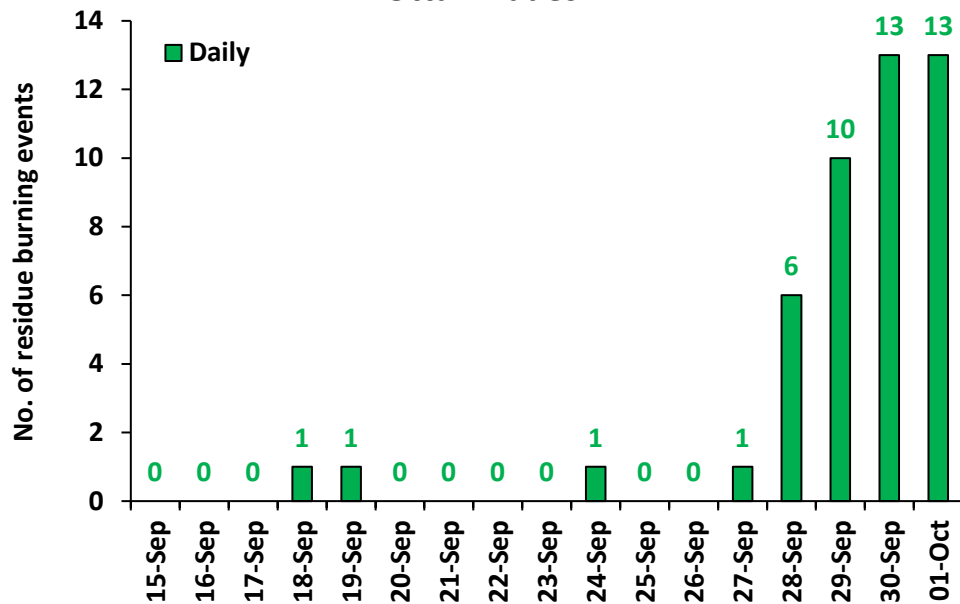
Highlights for 01-October-2021

- 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 **31** residue burning events in the six study States on 01-Oct-2021.
- The state wise events detected on 01-Oct-2021 were **13** in Punjab, **4** in Haryana, **13** in UP, **0** in Delhi, **1** in Rajasthan and **0** in MP.
- Detection of burning events by satellites was hampered due to cloud cover over Eastern Uttar Pradesh and Southern Rajasthan.

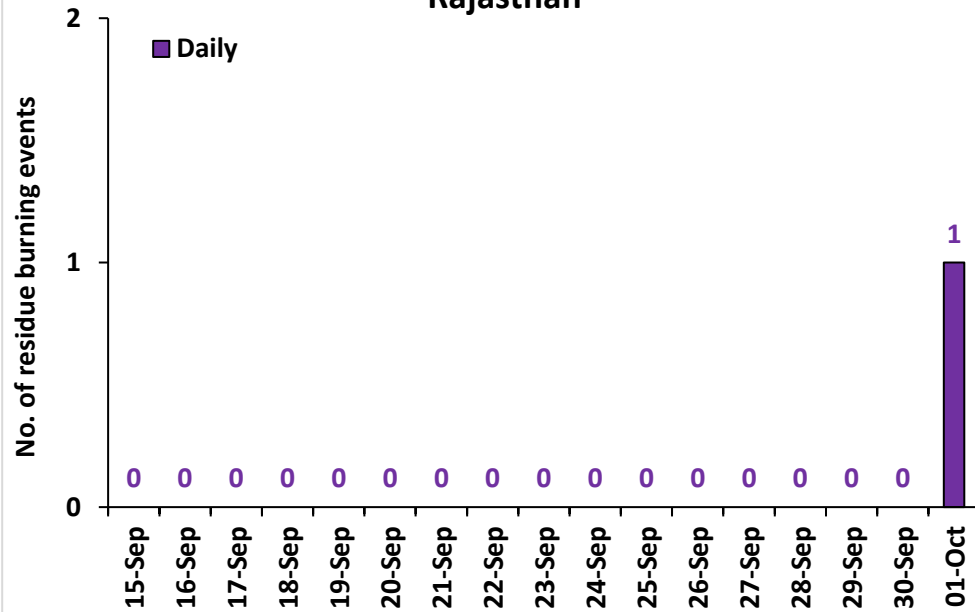
Temporal distribution of rice residue burning events for the study States in 2021



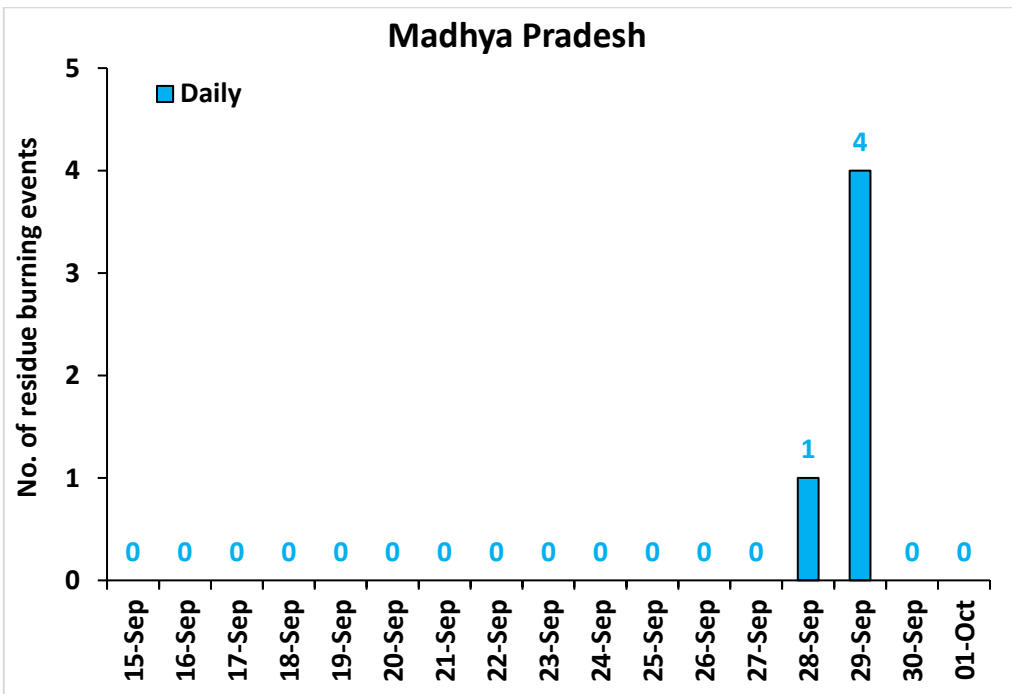
Uttar Pradesh



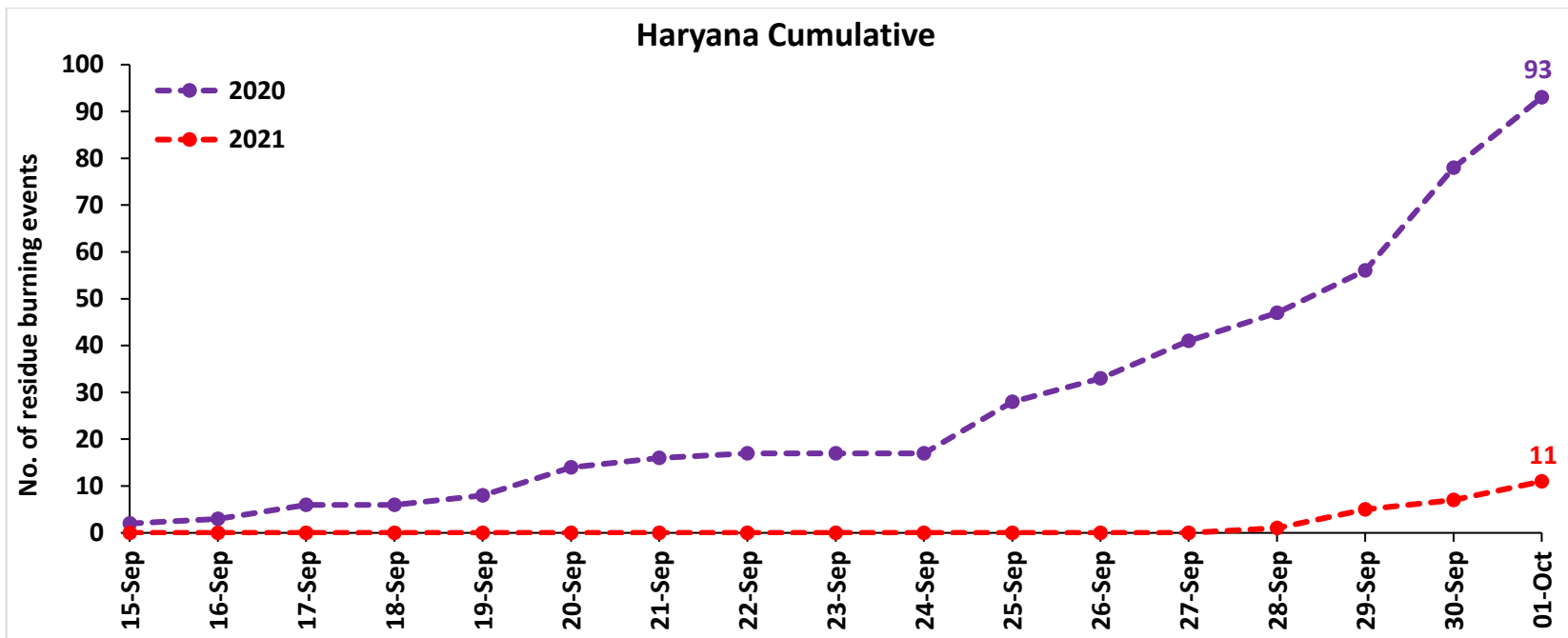
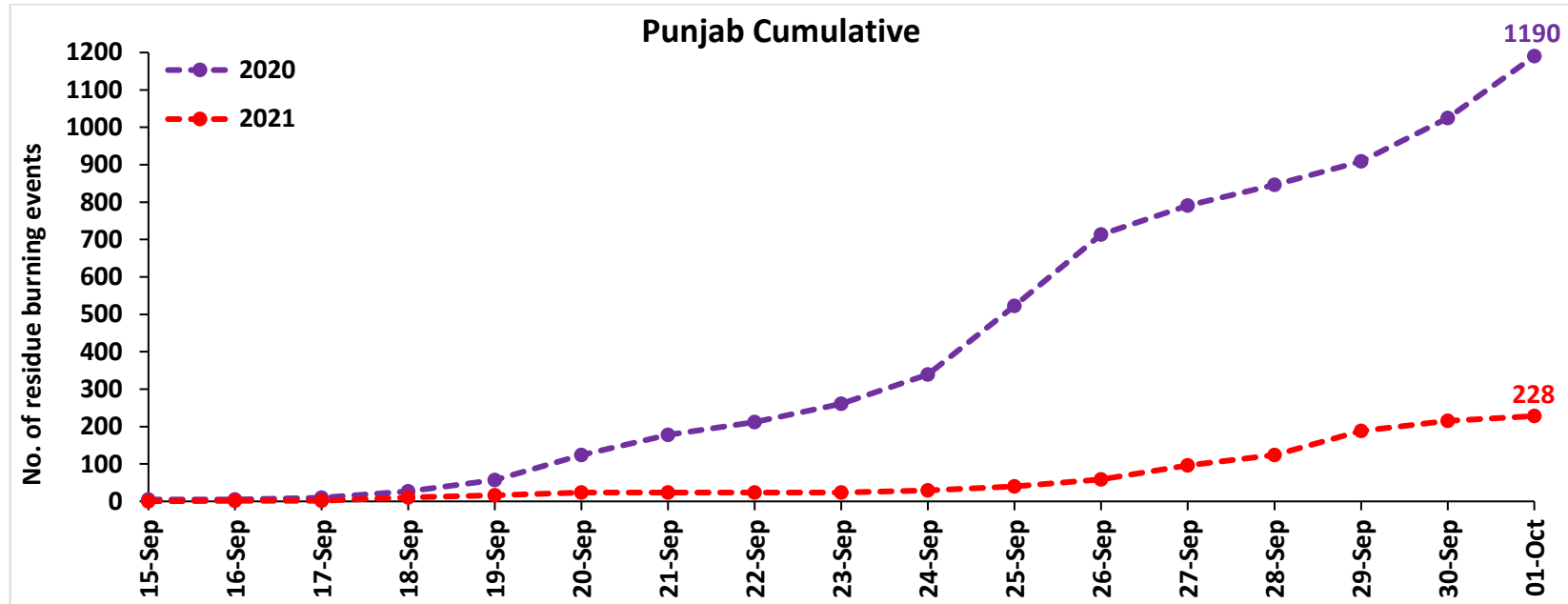
Rajasthan

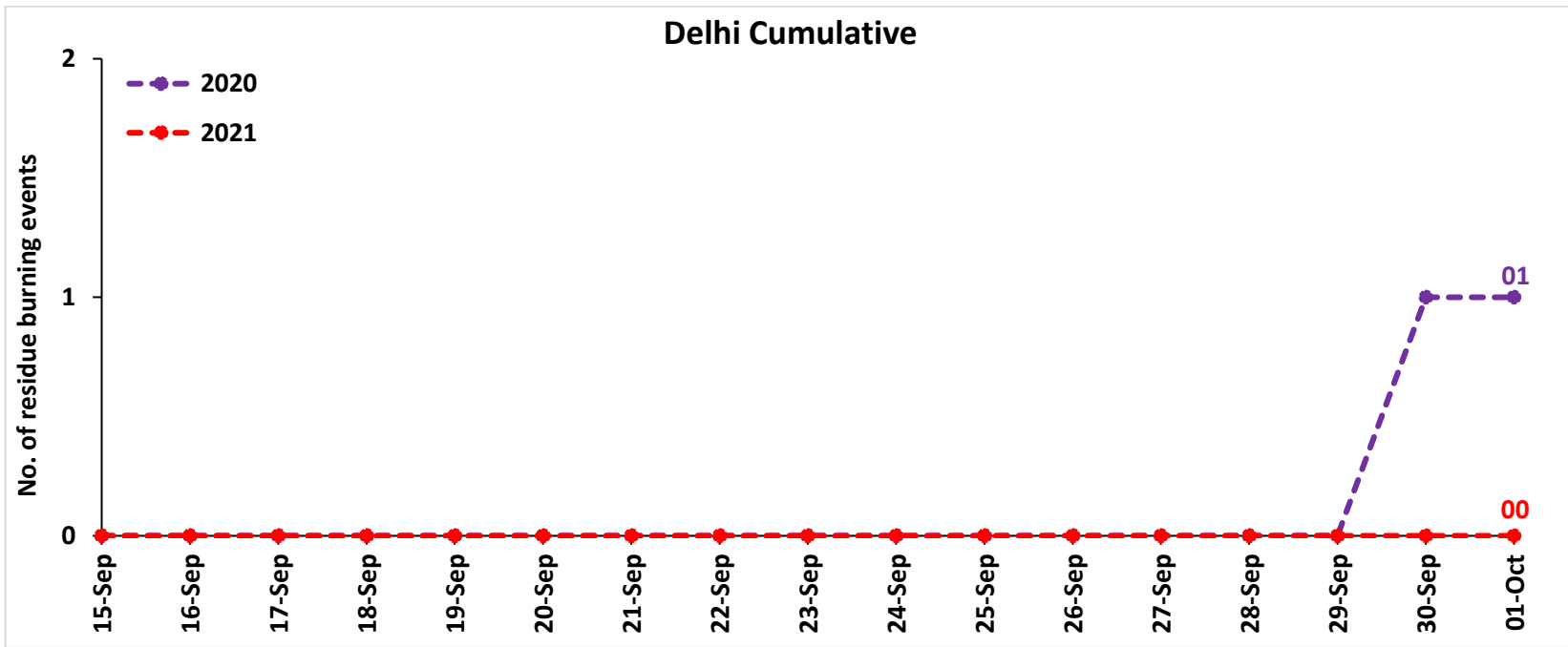
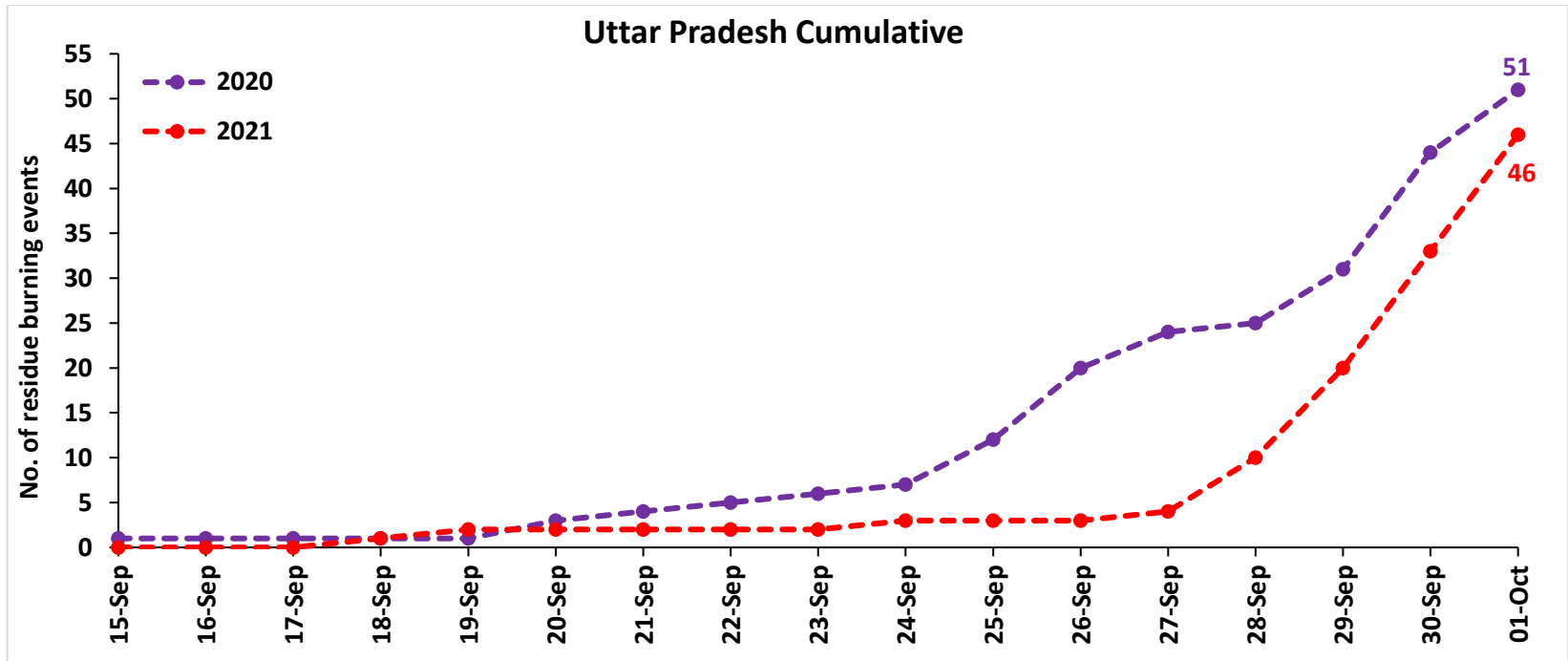


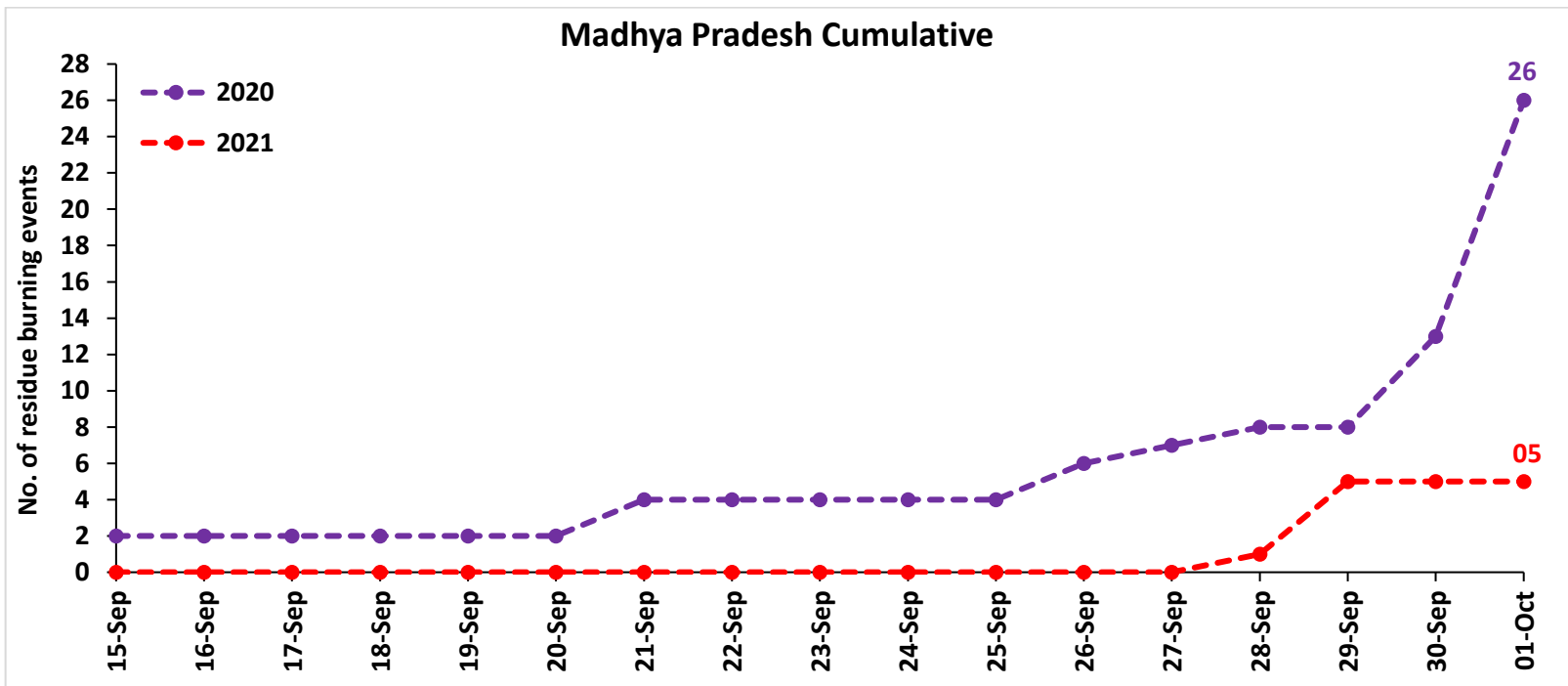
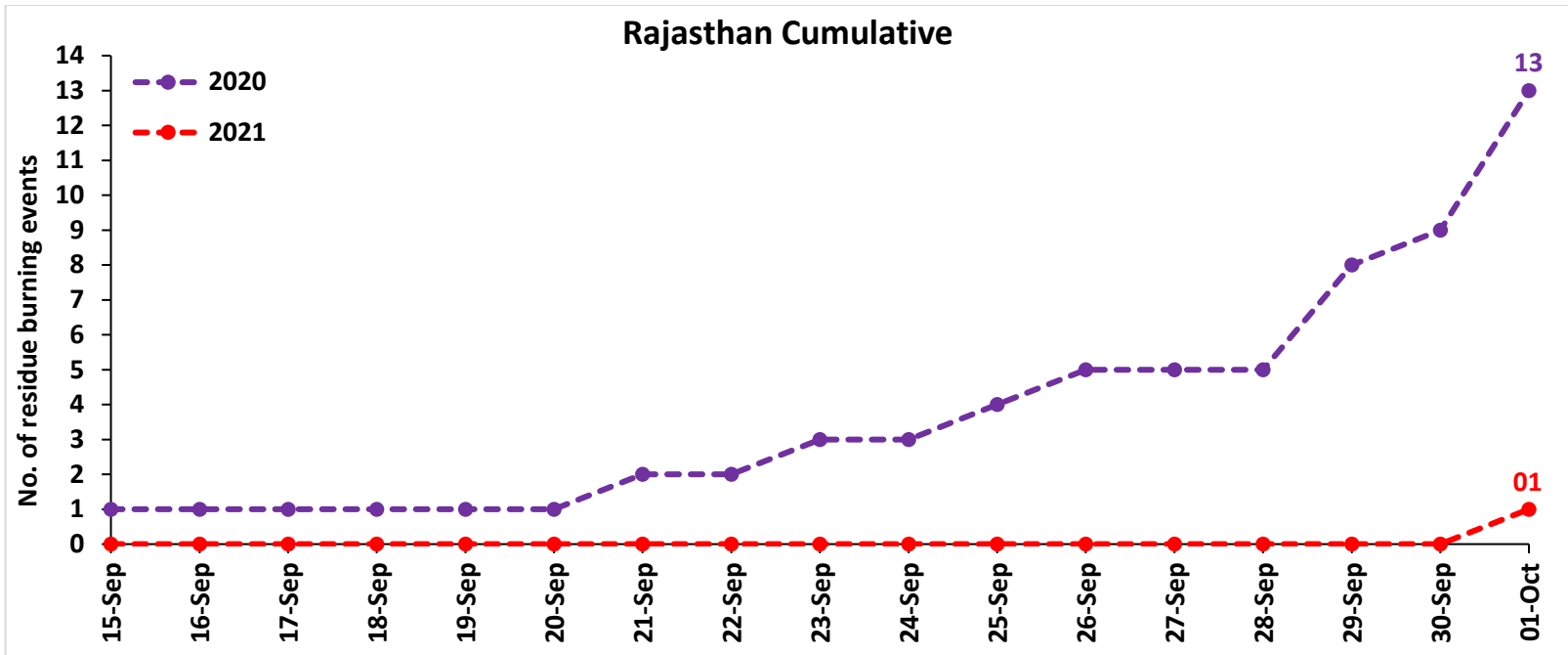
Madhya Pradesh



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

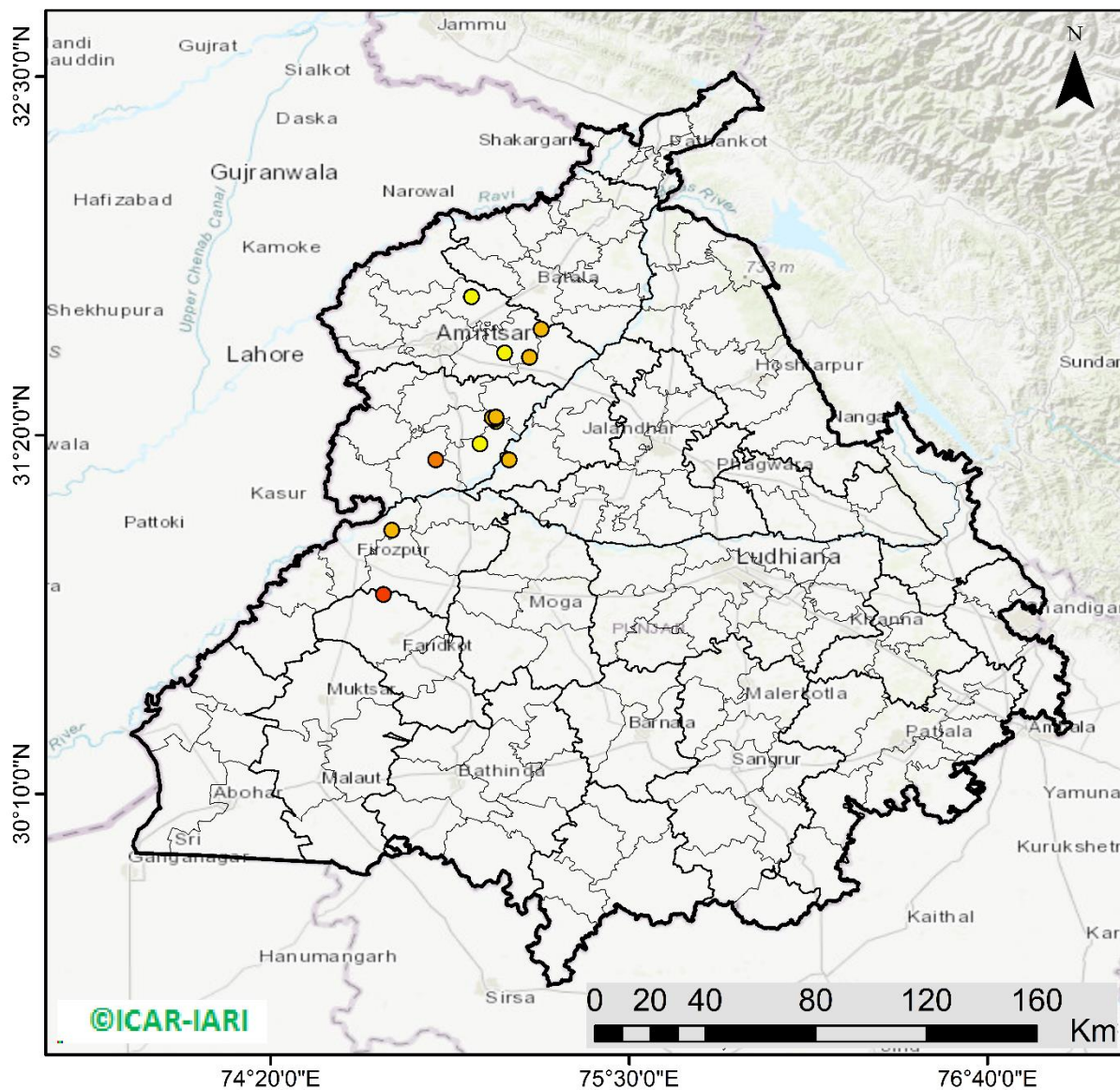






Punjab

RICE RESIDUE BURNING IN PUNJAB



13 burning events detected in Punjab on 01st October 2021

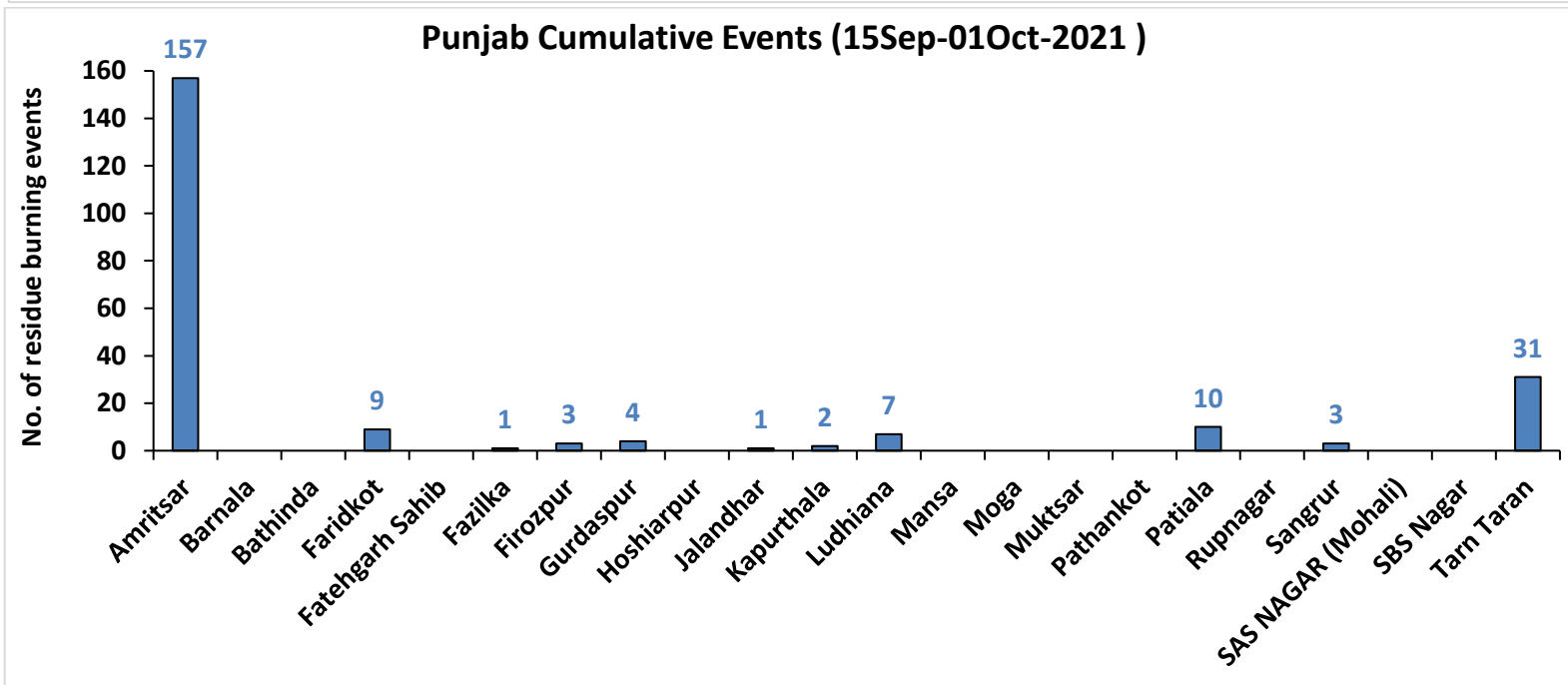
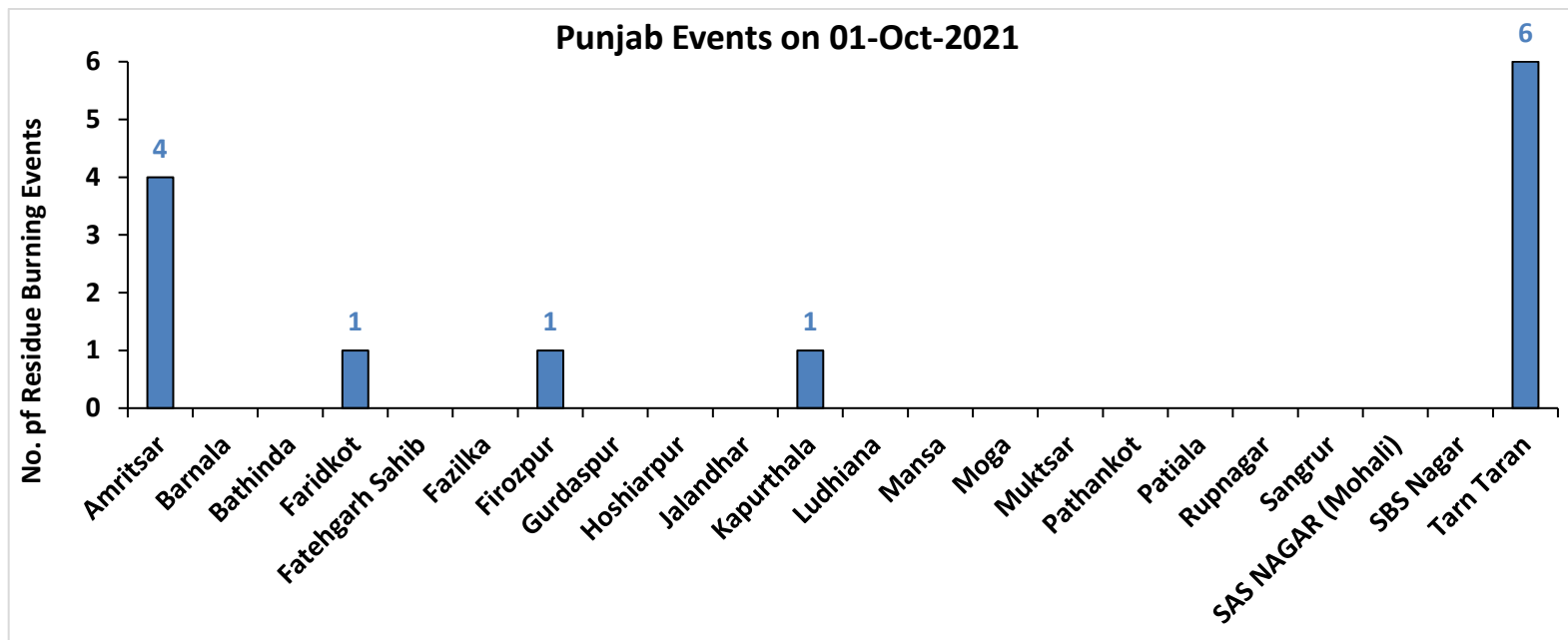
Fire Intensity (W/m²)

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



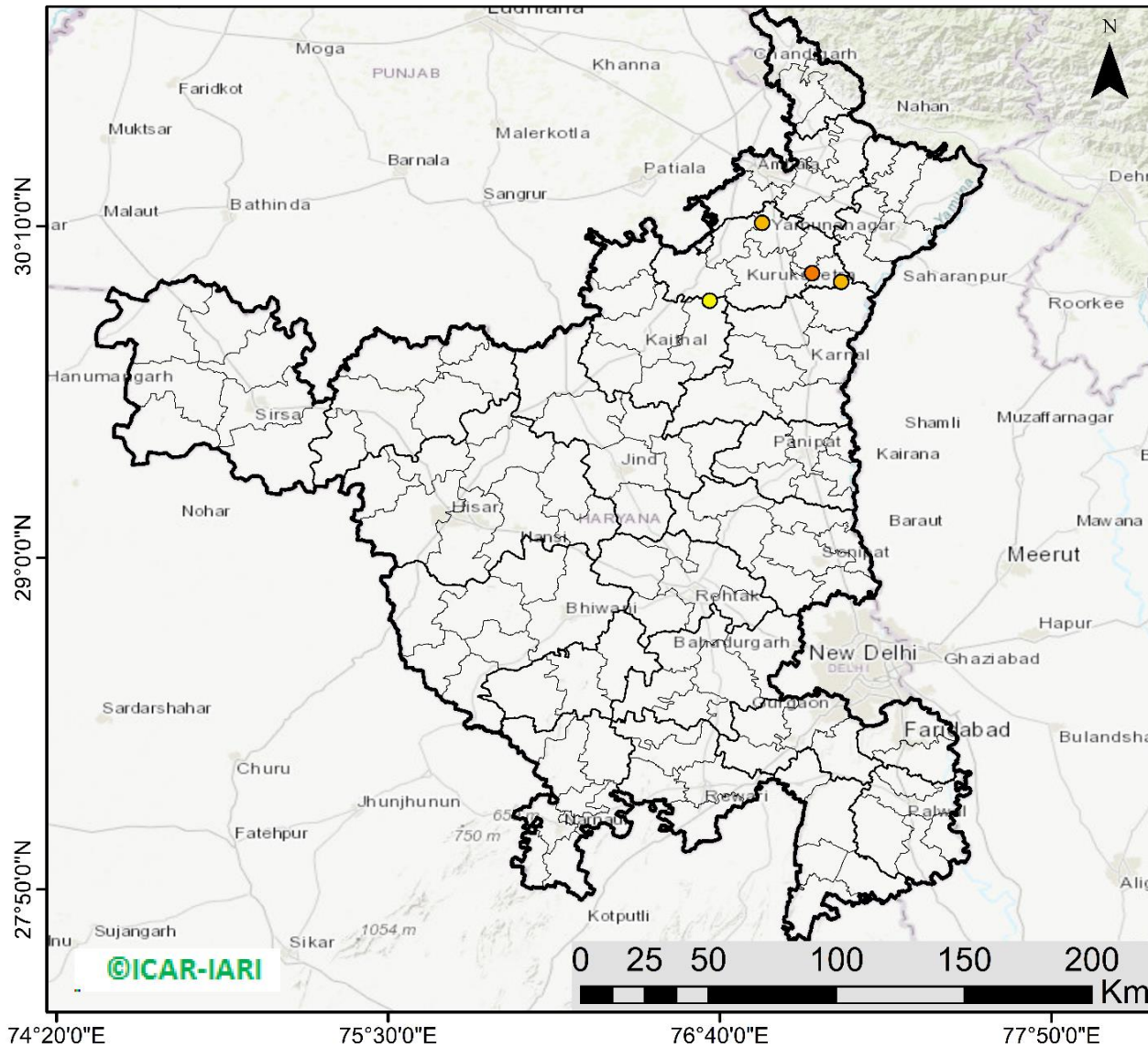
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Punjab (15 Sep-01 Oct-2021)



Haryana

RICE RESIDUE BURNING IN HARYANA



04 burning events detected in Haryana on 01st October 2021

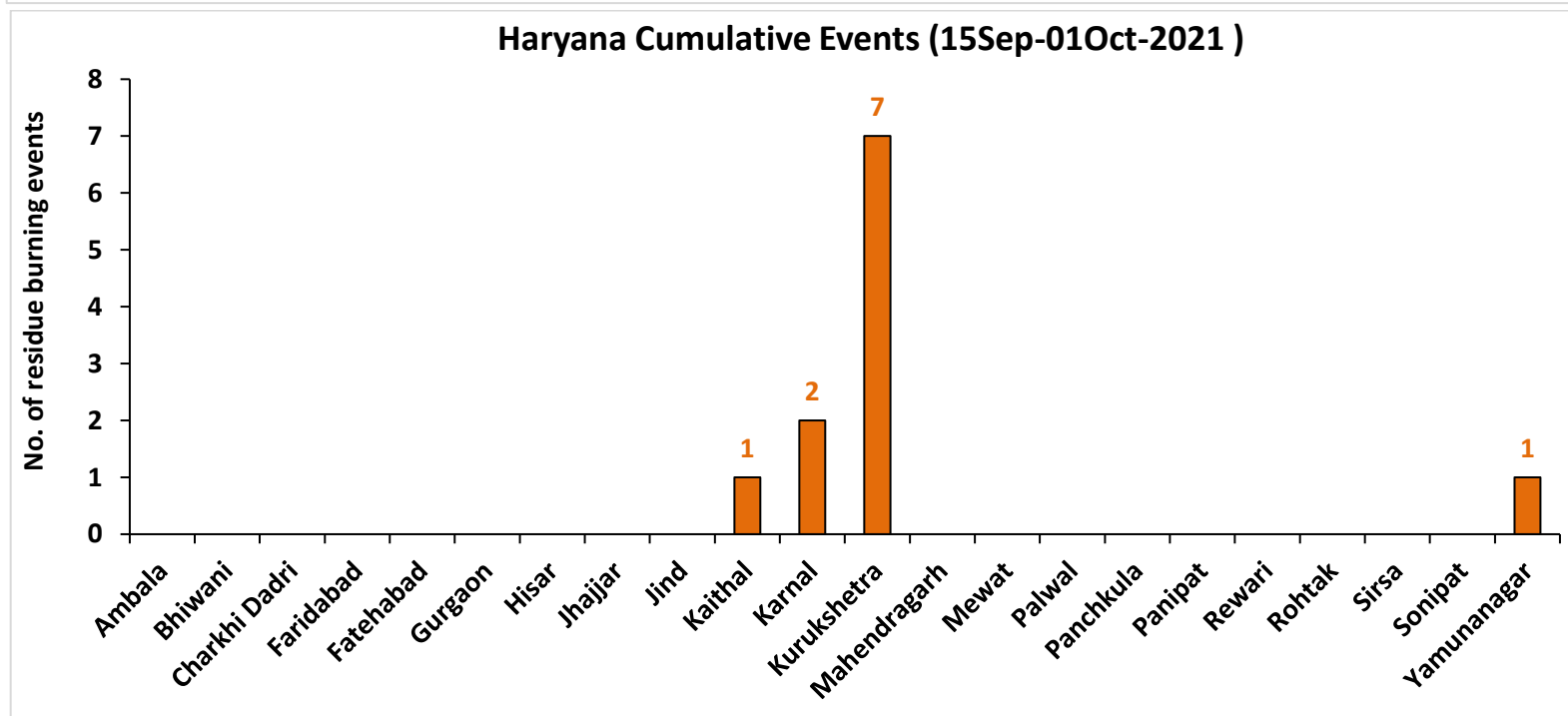
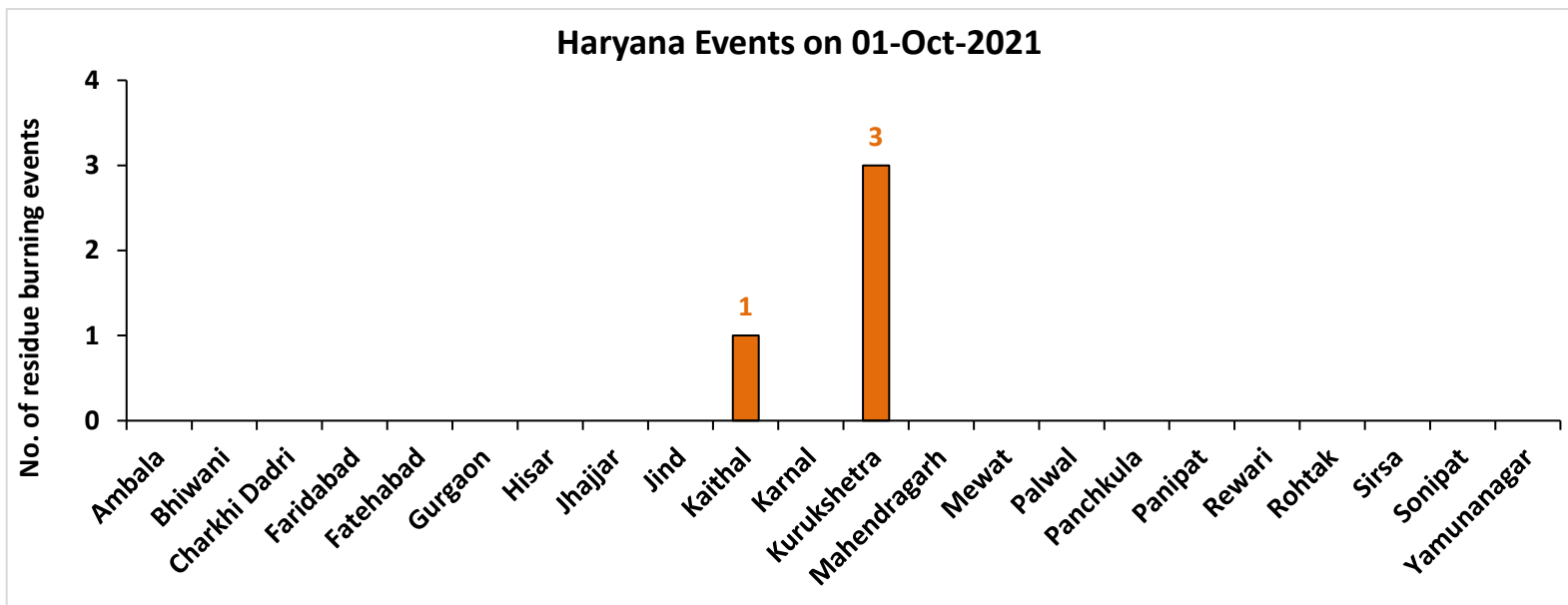
Fire Intensity (W/m²)

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



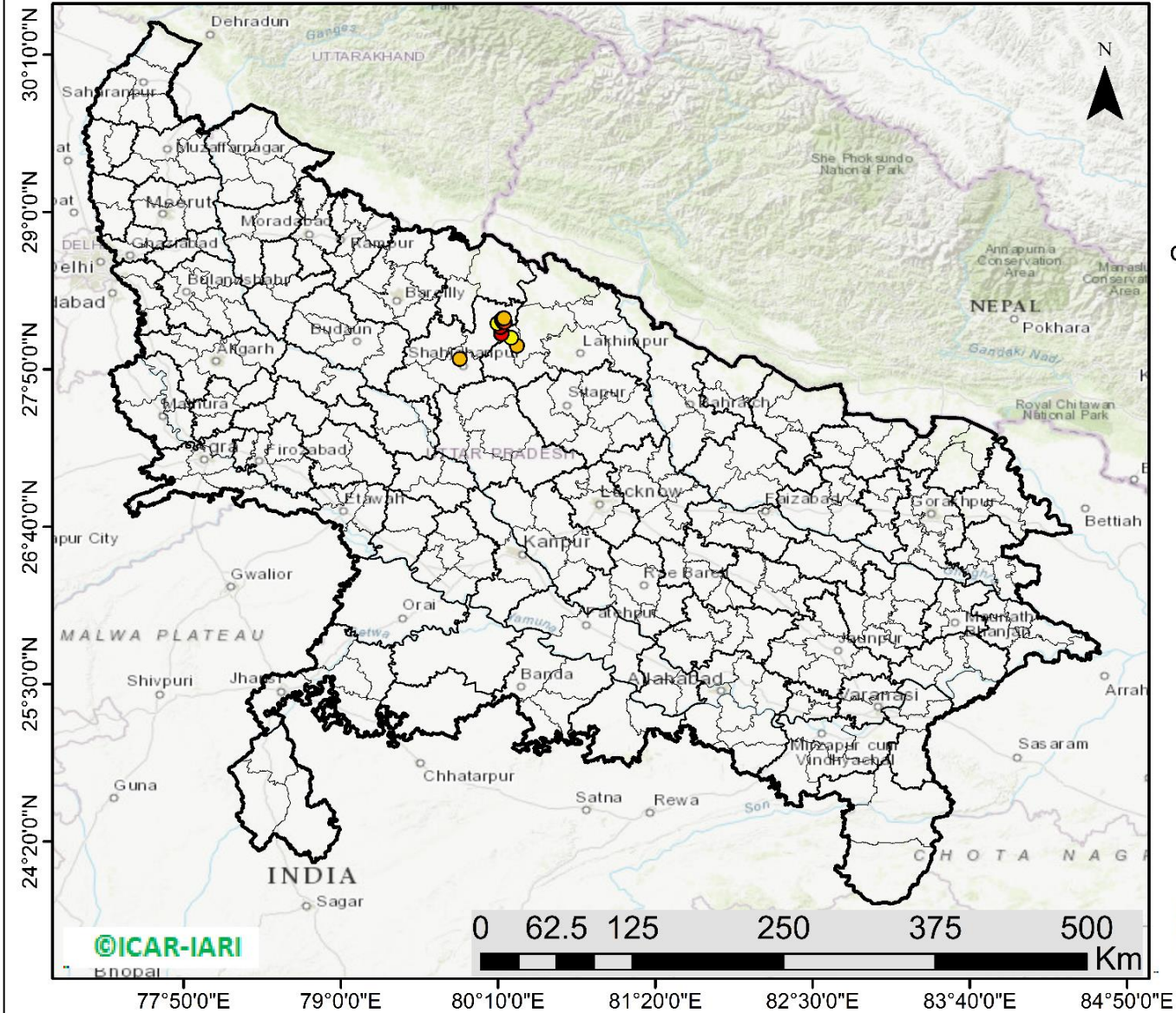
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Haryana (15 Sep-01 Oct-2021)



Uttar Pradesh

RICE RESIDUE BURNING IN UTTAR PRADESH



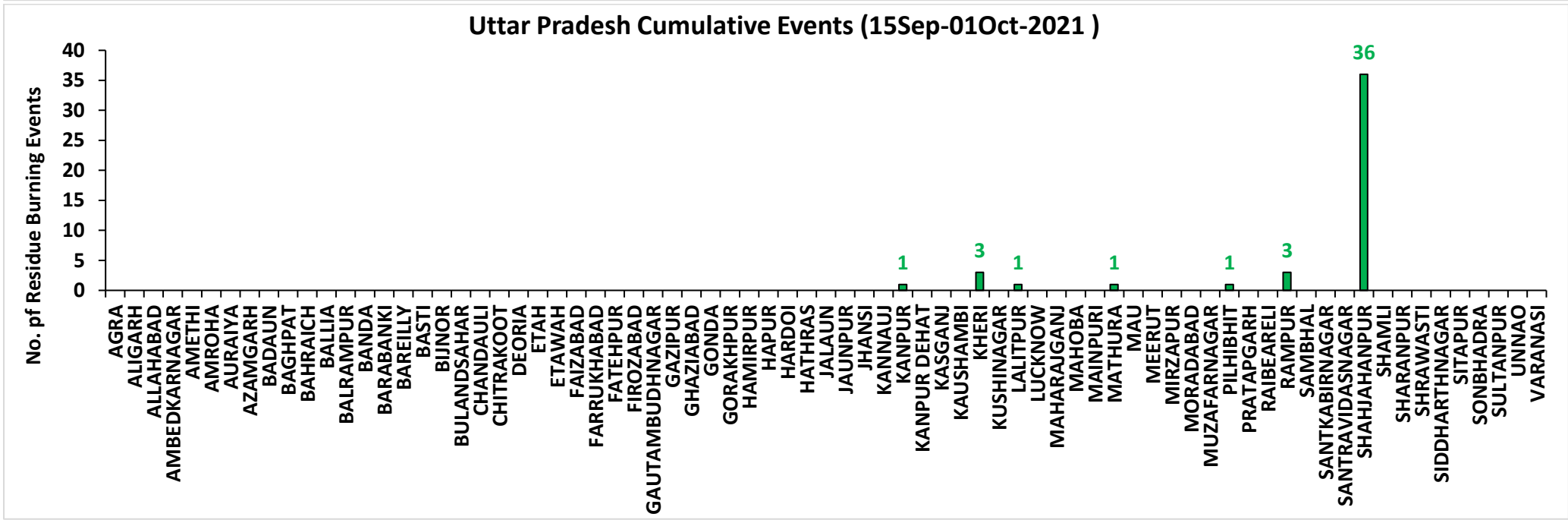
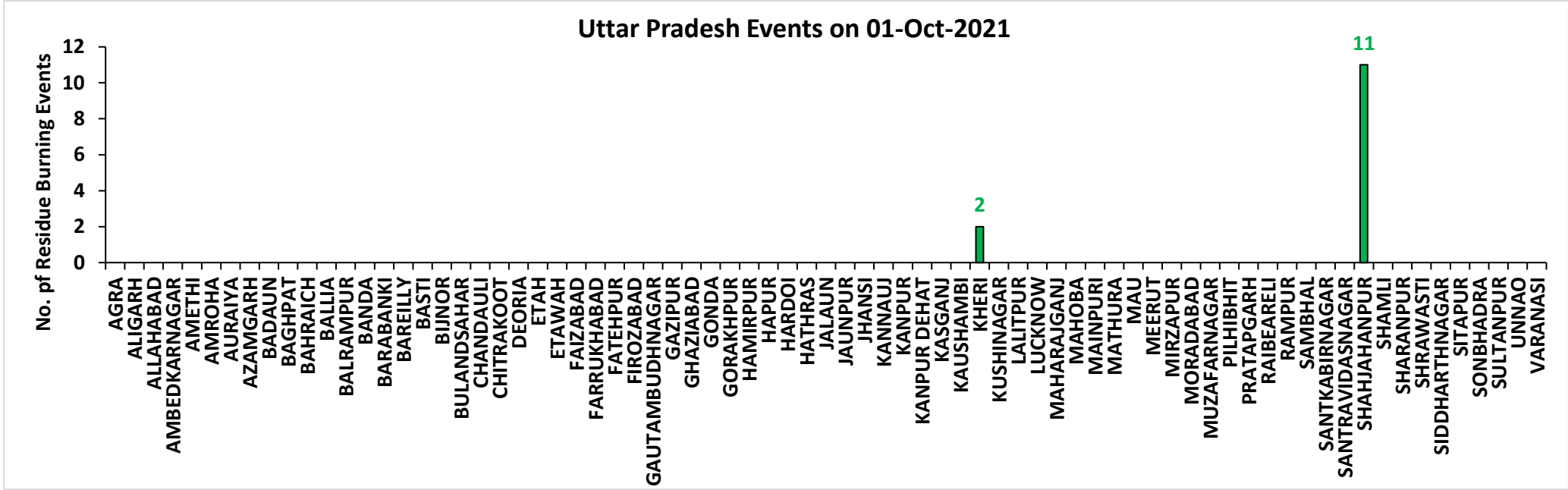
13 burning events detected in Uttar Pradesh on 01st October 2021

Fire Intensity (W/m²)

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

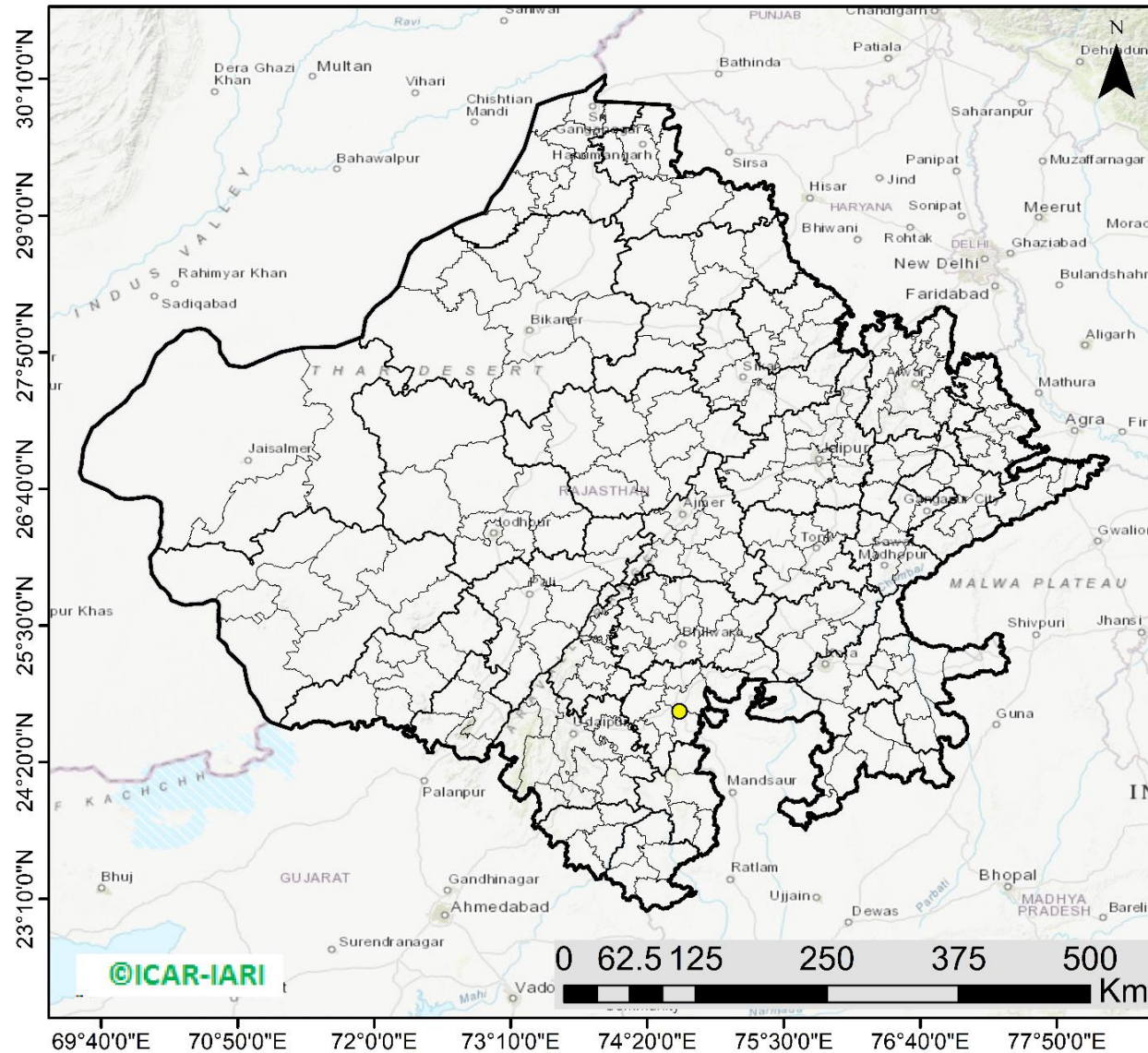
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Uttar Pradesh (15 Sep-01 Oct-2021)



Rajasthan

RICE RESIDUE BURNING IN RAJASTHAN



01 burning events detected in Rajasthan on **01st October 2021**

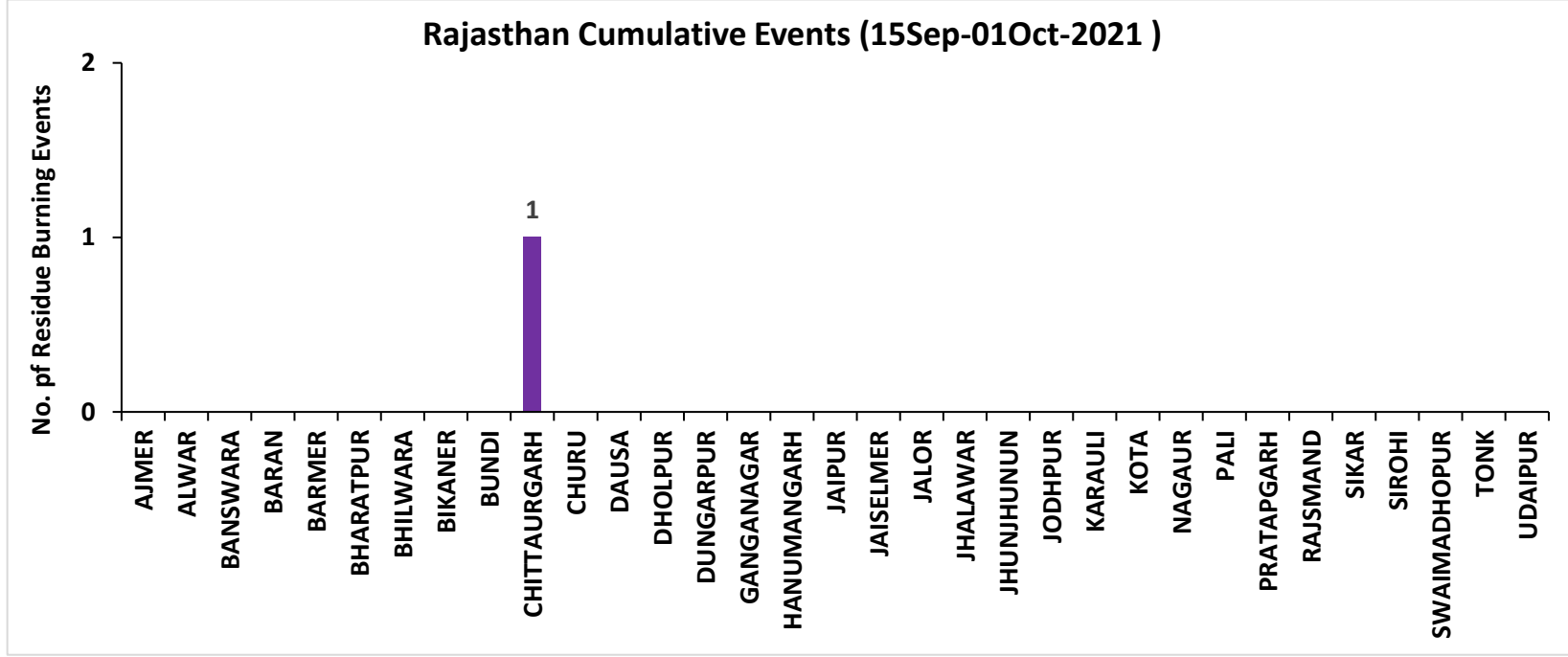
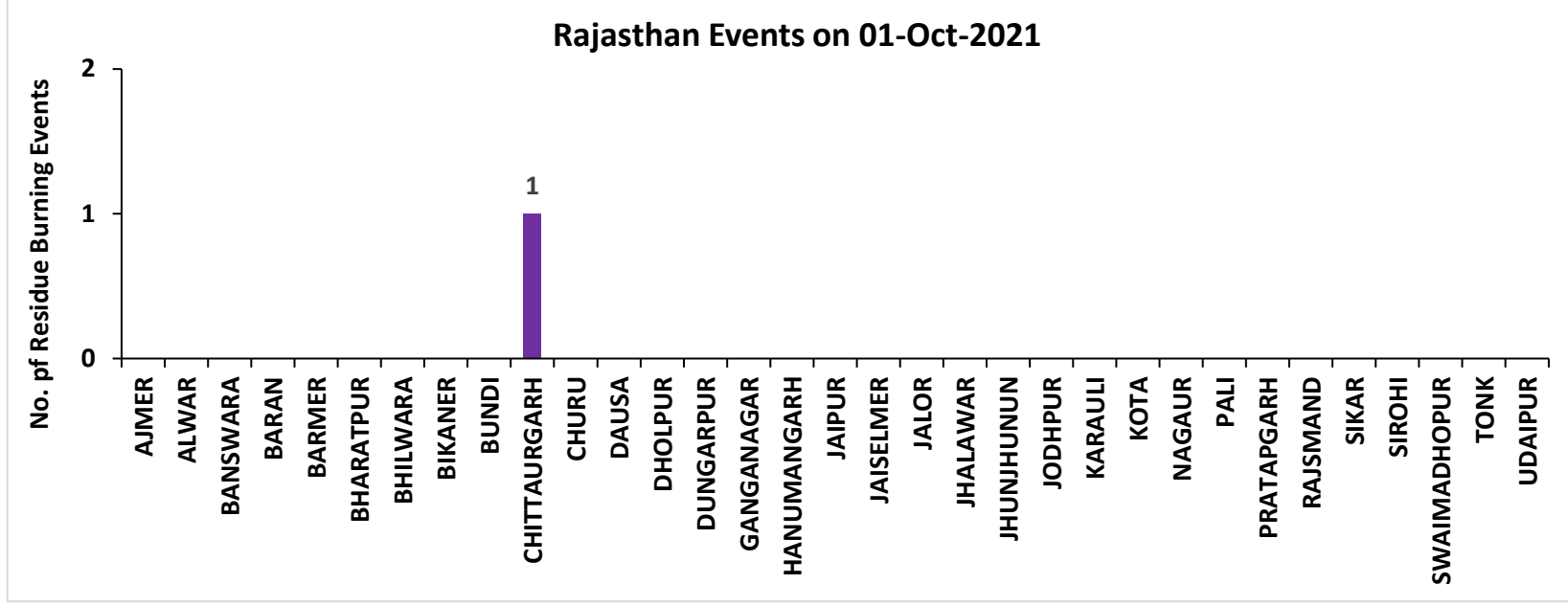
Fire Intensity (W/m²)

- 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 Rajasthan (15 Sep-01 Oct-2021)



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

(Period: 15 September-01 October)

(a) Punjab

District	15 Sep – 01 Oct	
	2020	2021
AMRITSAR	827	157
BARNALA	2	0
BATHINDA	0	0
FARIDKOT	3	9
FATEHGARH SAHIB	8	0
FAZILKA	0	1
FIROZPUR	12	3
GURDASPUR	40	4
HOSHIARPUR	1	0
JALANDHAR	6	1
KAPURTHALA	10	2
LUDHIANA	21	7
MANSA	1	0
MOGA	6	0
MUKTSAR	1	0
PATHANKOT	0	0
PATIALA	34	10
RUPNAGAR	1	0
SANGRUR	9	3
SAS NAGAR (MOHALI)	7	0
SBS NAGAR	1	0
TARN TARAN	200	31
TOTAL	1190	228

(b) Haryana

District	15 Sep – 01 Oct	
	2020	2021
AMBALA	13	0
BHIWANI	0	0
CHARKHI DADRI	0	0
FARIDABAD	0	0
FATEHABAD	10	0
GURGAON	0	0
HISAR	2	0
JHAJJAR	0	0
JIND	0	0
KAITHAL	11	1
KARNAL	28	2
KURUKSHETRA	16	7
MAHENDRAGARH	0	0
MEWAT	0	0
PALWAL	1	0
PANCHKULA	0	0
PANIPAT	4	0
REWARI	0	0
ROHTAK	0	0
SIRSA	1	0
SONIPAT	1	0
YAMUNANAGAR	6	1
Total	93	11

(c) Uttar Pradesh

District	15 Sep – 01 Oct							
	2020	2021	GAUTAMBUDHNAGAR	0	0	MUZAFARNAGAR	0	0
AGRA	0	0	GAZIPUR	0	0	PILHIBHIT	1	1
ALIGARH	3	0	GHAZIABAD	1	0	PRATAPGARH	0	0
ALLAHABAD	0	0	GONDA	0	0	RAIBEARELI	1	0
AMBEDKARNAGAR	0	0	GORAKHPUR	0	0	RAMPUR	1	3
AMETHI	0	0	HAMIRPUR	0	0	SAMBHAL	4	0
AMROHA	0	0	HAPUR	1	0	SANTKABIRNAGAR	0	0
AURAIYA	10	0	HARDOI	0	0	SANTRAVIDASNAGAR	0	0
AZAMGARH	0	0	HATHRAS	0	0	SHAHJAHANPUR	3	36
BADAUN	0	0	JALAUN	0	0	SHAMLI	6	0
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	0	0	SONBHADRA	0	0
BARABANKI	0	0	KASGANJ	0	0	SULTANPUR	0	0
BAREILLY	0	0	KAUSHAMBI	1	0	UNNAO	2	0
BASTI	0	0	KHERI	0	3	VARANASI	0	0
BIJNOR	1	0	KUSHINAGAR	0	0	Total	51	46
BULANDSAHAR	0	0	LALITPUR	0	1			
CHANDAULI	0	0	LUCKNOW	0	0			
CHITRAKOOT	0	0	MAHARAJGANJ	0	0			
DEORIA	0	0	MAHOPA	0	0			
ETAH	1	0	MAINPURI	0	0			
ETAWAH	0	0	MATHURA	1	1			
FAIZABAD	0	0	MAU	0	0			
FARRUKHABAD	0	0	MEERUT	6	0			
FATEHPUR	0	0	MIRZAPUR	0	0			
FIROZABAD	0	0	MORADABAD	0	0			

(d) Delhi

District	15 Sep – 01 Oct	
	2020	2021
CENTRAL	0	0
EAST	0	0
NEW DELHI	0	0
NORTH	0	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	1	0

(e) Rajasthan

District	15 Sep – 01 Oct	
	2020	2021
AJMER	0	0
ALWAR	1	0
BANSWARA	0	0
BARAN	4	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	1	0
JAIPUR	0	0
JAISELMER	1	0
JALOR	0	0
JHALAWAR	0	0
JHUNJHUNUN	0	0
JODHPUR	1	0
KARALI	0	0
KOTA	0	0
NAGAU	0	0
PALI	0	0
PRATAPGARH	0	0
RAJSMAND	0	0
SIKAR	0	0
SIROHI	0	0
SWAIMADHOPUR	0	0
TONK	0	0
UDAIPUR	0	0
Total	13	1

(f) Madhya Pradesh

District	15 Sep – 01 Oct				
	2020	2021			
			PANNA	0	0
ALIRAJPUR	0	0	RAISEN	0	0
ANUPPUR	0	0	RAJGARH	1	0
ASHOKNAGAR	3	0	RATLAM	0	0
BALAGHAT	0	0	REWA	0	0
BARWANI	0	0	SAGAR	2	2
BETUL	0	0	SATNA	0	0
BHIND	0	0	SEHORE	1	0
BHOPAL	1	0	SEONI	0	0
BURHANPUR	0	0	SHAHDOL	0	0
CHHATARPUR	0	0	SHAJAPUR	1	0
CHHINDWARA	0	0	SHEOPUR	0	0
DAMOH	0	0	SHIVPURI	0	0
DATIA	0	0	SIDHI	0	0
DEWAS	0	0	SINGRAULI	0	0
DHAR	0	0	TIKAMGARH	0	0
DINDORI	0	0	UJJAIN	3	0
EAST NIMAR	0	0	UMARIA	0	0
GUNA	4	1	VIDESHA	3	1
GWALIOR	3	0	WEST NIMAR	0	0
HARDA	2	1	Total	26	5
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 - 01 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
Total	1190	228	93	11	51	46	1	0	13	1	26	5

Details of residue burning events in Punjab on 01-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	AMRITSAR	JANDIALA GURU	S-NPP	31.60060	75.09540	1/10/2021	12:45:48	D	3.90
2	AMRITSAR	MAJITHA	S-NPP	31.78340	74.98730	1/10/2021	12:45:48	D	3.10
3	AMRITSAR	TARSIKKA	S-NPP	31.58630	75.17620	1/10/2021	12:45:48	D	5.40
4	AMRITSAR	TARSIKKA	AQUA	31.67800	75.21400	1/10/2021	13:32:15	D	6.10
5	FARIDKOT	FARIDKOT	AQUA	30.81500	74.70100	1/10/2021	13:32:15	D	15.10
6	FIROZPUR	FIROZPUR	AQUA	31.02400	74.72800	1/10/2021	13:32:15	D	8.10
7	KAPURTHALA	SULTANPUR LODHI	AQUA	31.25300	75.11000	1/10/2021	13:32:15	D	6.80
8	TARN TARAN	CHOHLA SAHIB	S-NPP	31.30500	75.01510	1/10/2021	14:26:05	D	3.60
9	TARN TARAN	CHOHLA SAHIB	S-NPP	31.37780	75.06710	1/10/2021	14:26:05	D	4.50
10	TARN TARAN	CHOHLA SAHIB	AQUA	31.38500	75.06300	1/10/2021	13:32:15	D	9.40
11	TARN TARAN	KHADUR SAHIB	AQUA	31.39000	75.05500	1/10/2021	13:32:15	D	7.50
12	TARN TARAN	KHADUR SAHIB	AQUA	31.39200	75.06700	1/10/2021	13:32:15	D	7.60
13	TARN TARAN	PATTI	AQUA	31.25300	74.87100	1/10/2021	13:32:15	D	13.50

Details of residue burning events in Haryana on 01-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	KAITHAL	PUNDRI	S-NPP	29.90390	76.63160	1/10/2021	12:45:48	D	3.40
2	KURUKSHETRA	LADWA	AQUA	29.97000	77.09400	1/10/2021	13:32:15	D	5.40
3	KURUKSHETRA	LADWA	AQUA	30.00100	76.99200	1/10/2021	13:32:15	D	11.20
4	KURUKSHETRA	SHAHBAD	AQUA	30.17800	76.81600	1/10/2021	13:32:15	D	9.10

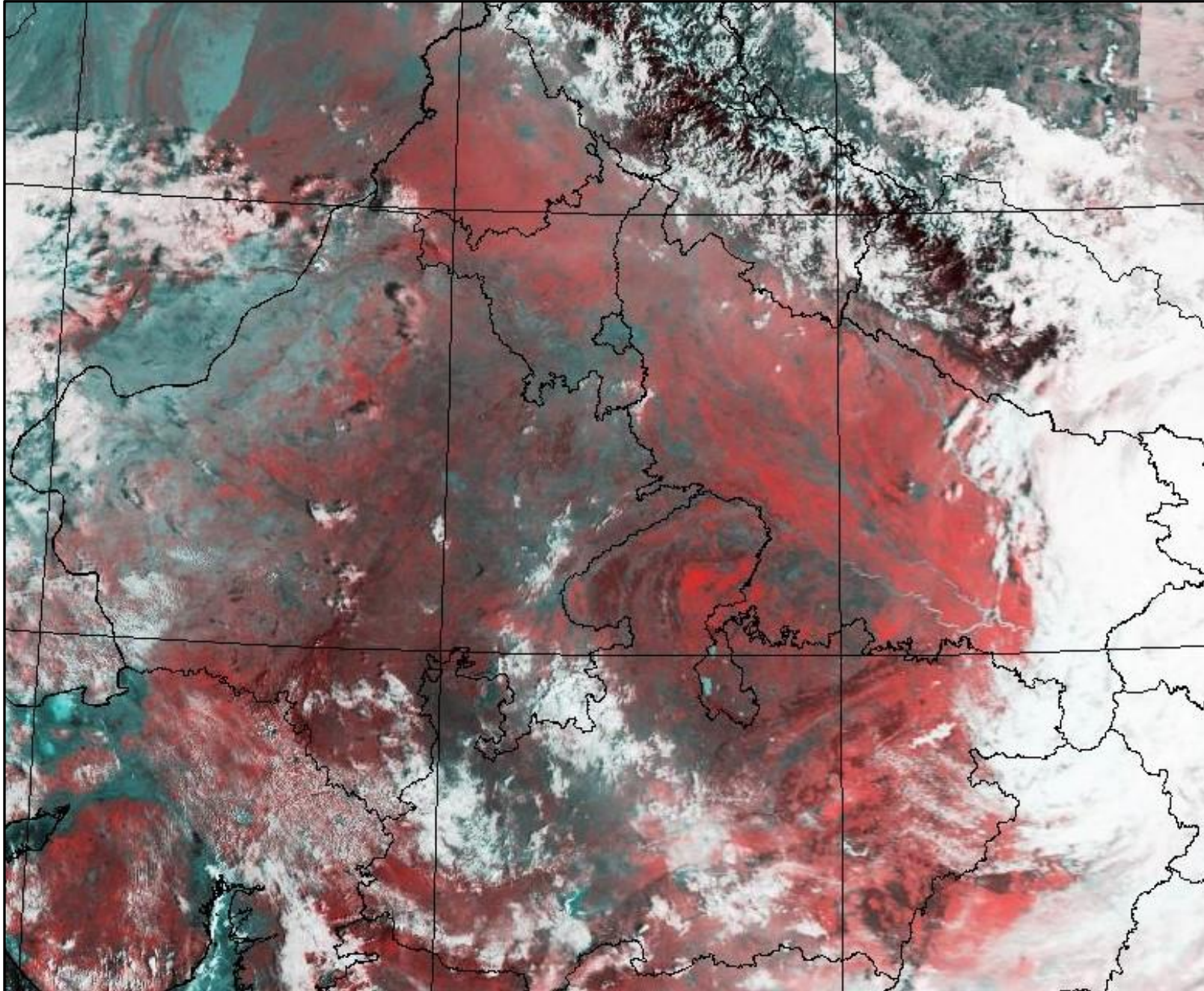
Details of residue burning events in Uttar Pradesh on 01-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	KHERI	MOHMADI	S-NPP	28.00640	80.30750	1/10/2021	12:45:48	D	5.70
2	KHERI	MOHMADI	S-NPP	28.06640	80.26430	1/10/2021	12:45:48	D	4.00
3	SHAHJAHANPUR	PUWANYA	S-NPP	28.09570	80.18890	1/10/2021	12:45:48	D	9.00
4	SHAHJAHANPUR	PUWANYA	S-NPP	28.09660	80.19350	1/10/2021	12:45:48	D	21.10
5	SHAHJAHANPUR	PUWANYA	S-NPP	28.14460	80.18590	1/10/2021	12:45:48	D	27.00
6	SHAHJAHANPUR	PUWANYA	S-NPP	28.14570	80.18360	1/10/2021	12:45:48	D	29.60
7	SHAHJAHANPUR	PUWANYA	S-NPP	28.17270	80.16200	1/10/2021	12:45:48	D	2.60
8	SHAHJAHANPUR	PUWANYA	S-NPP	28.20160	80.19330	1/10/2021	12:45:48	D	1.70
9	SHAHJAHANPUR	PUWANYA	AQUA	28.18100	80.20500	1/10/2021	13:32:15	D	9.10
10	SHAHJAHANPUR	PUWANYA	AQUA	28.18300	80.21600	1/10/2021	13:32:15	D	15.90
11	SHAHJAHANPUR	PUWANYA	AQUA	28.20900	80.20100	1/10/2021	13:32:15	D	11.70
12	SHAHJAHANPUR	PUWANYA	AQUA	28.21100	80.21200	1/10/2021	13:32:15	D	8.00
13	SHAHJAHANPUR	SHAHJAHANPUR	S-NPP	27.90940	79.88270	1/10/2021	12:45:48	D	5.20

Details of residue burning events in Rajasthan on 01-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	CHITTAURGARH	CHITTAURGARH	S-NPP	24.76600	74.60900	1/10/2021	01:35:48	N	1.10

METOP-2 (VHRR) Satellite image (FCC) of North and Central India Acquired on 01-Oct-2021 at 08::48:05 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)
