

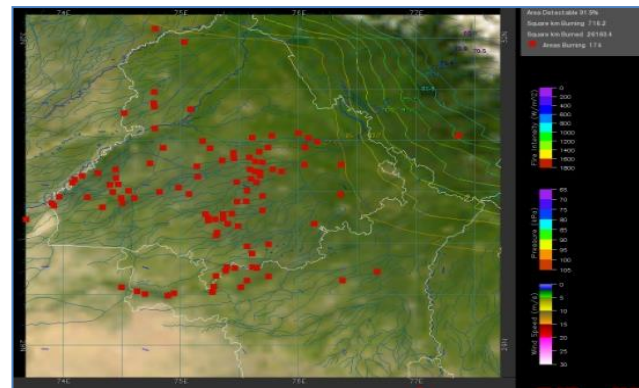
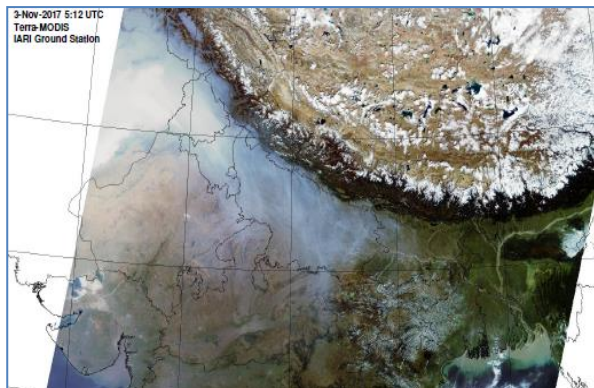


MONITORING PADDY RESIDUE BURNING IN INDIA USING SATELLITE REMOTE SENSING DURING 2022

**Bulletin
No. 17**

**Events Date:
01-Oct-2022**

**Issued on:
01-Oct-2022**



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**

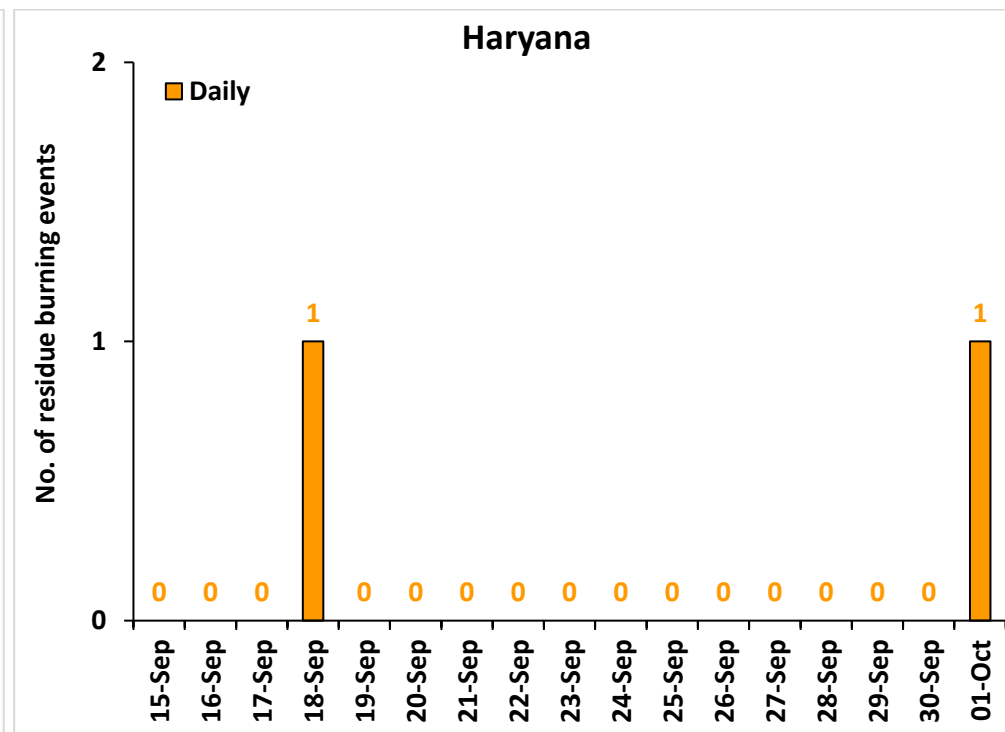
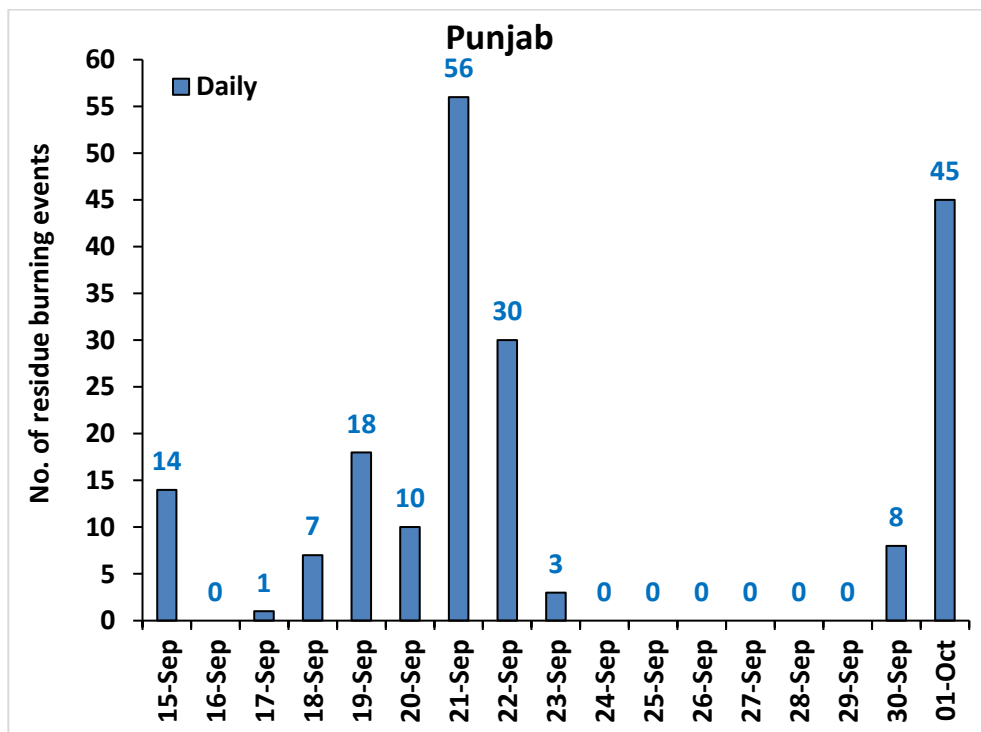
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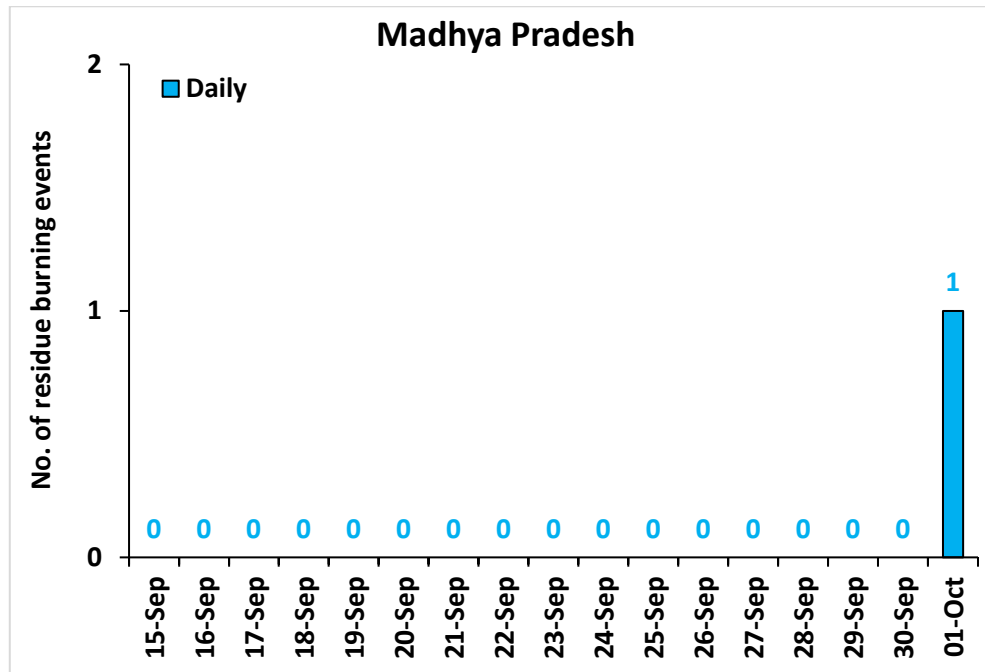
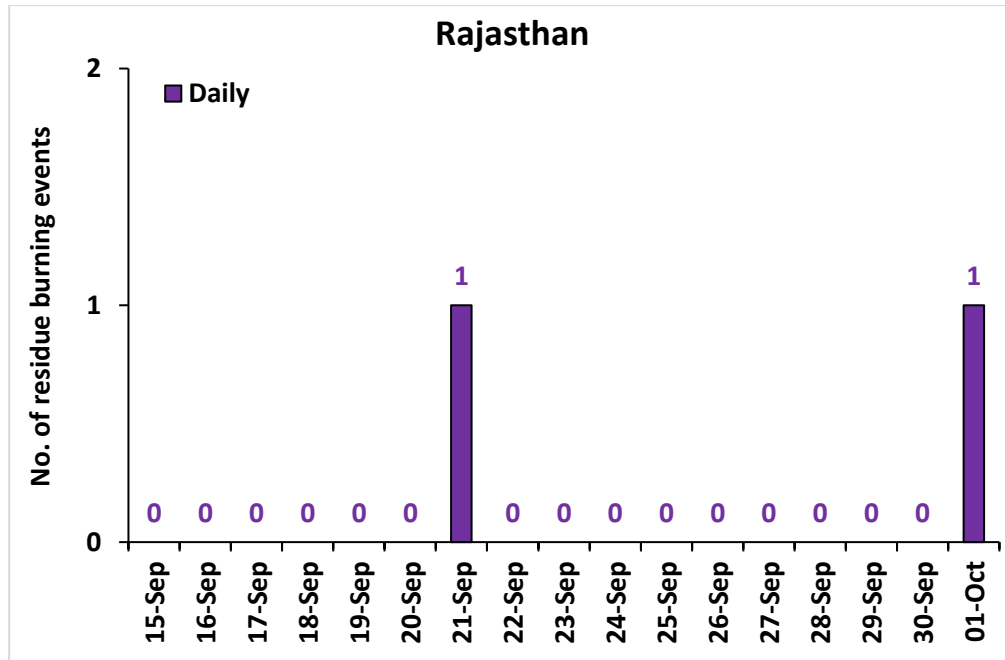
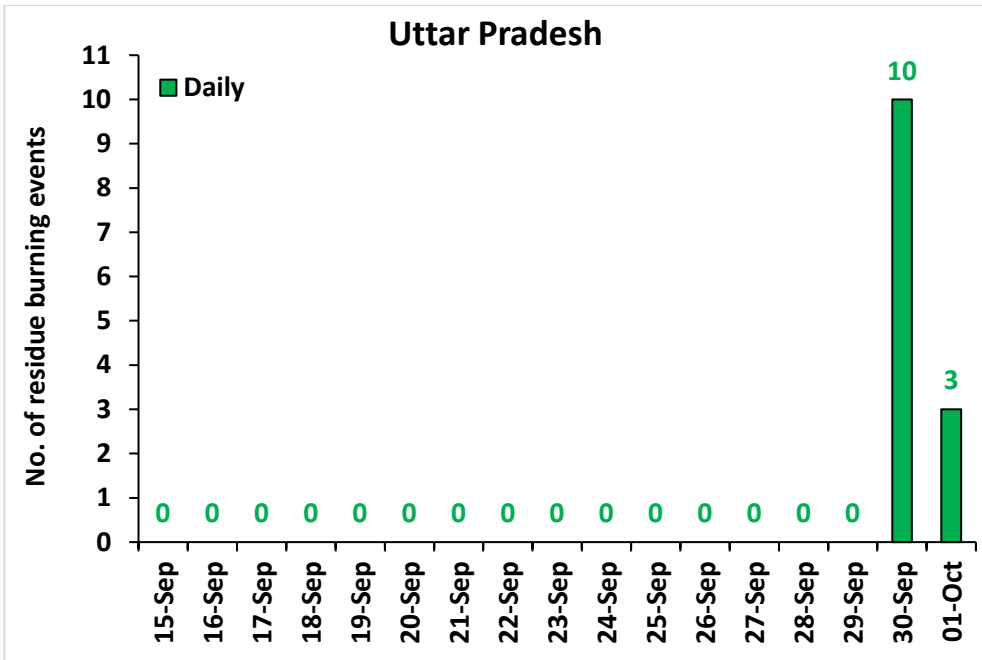


Highlights for 01-Oct-2022

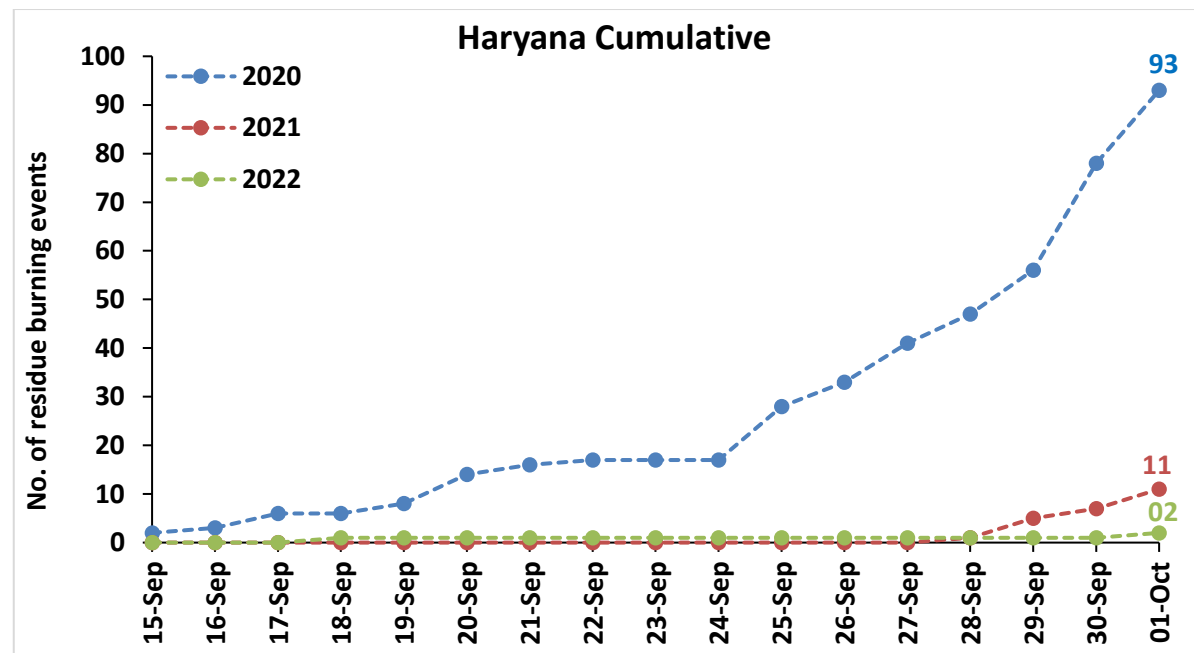
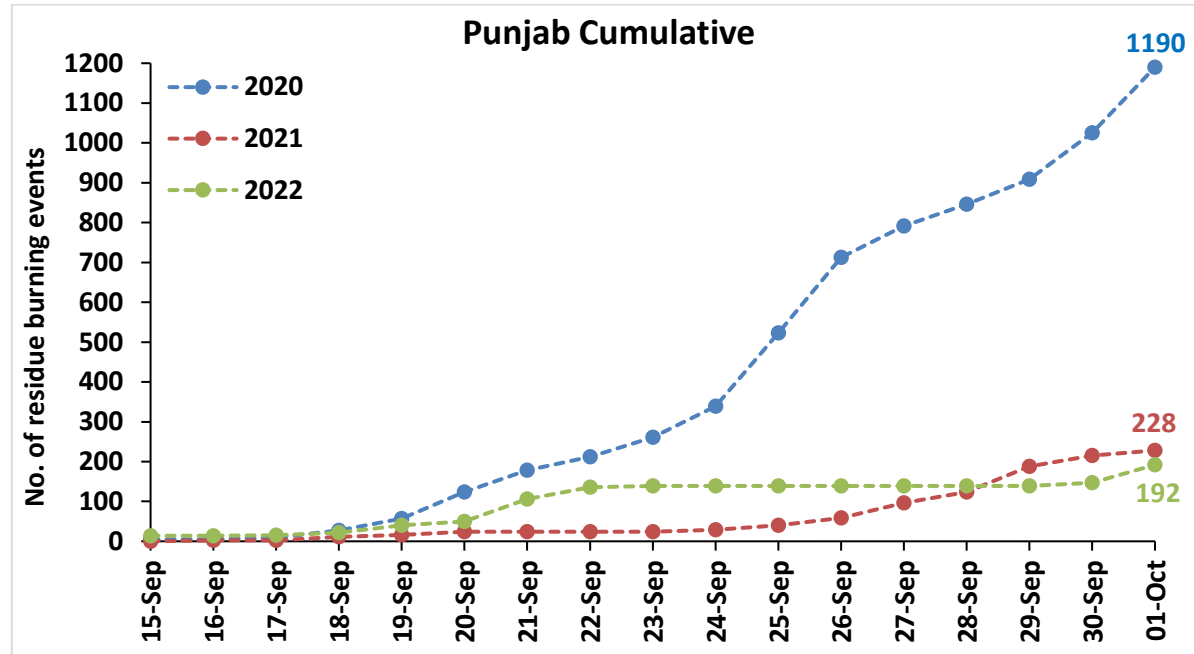
- The active fire events due to rice residue burning were monitored using satellite remote sensing, following the "Standard Protocol for Estimation of Crop Residue Burning Fire Events using Satellite Data".
- Satellites detected **51** residue burning events in the six study States on 01-Oct-2022.
- The state wise events detected on 01-Oct-2022 were **45** in Punjab, **1** in Haryana, **3** in UP, **0** in Delhi, **1** in Rajasthan and **1** in MP.
- Total **210** burning events were detected in the six states between 15-Sept-2022 and 01-Oct-2022, which are distributed as **192, 2, 13, 0, 2** and **1** in Punjab, Haryana, UP, Delhi, Rajasthan and MP, respectively.

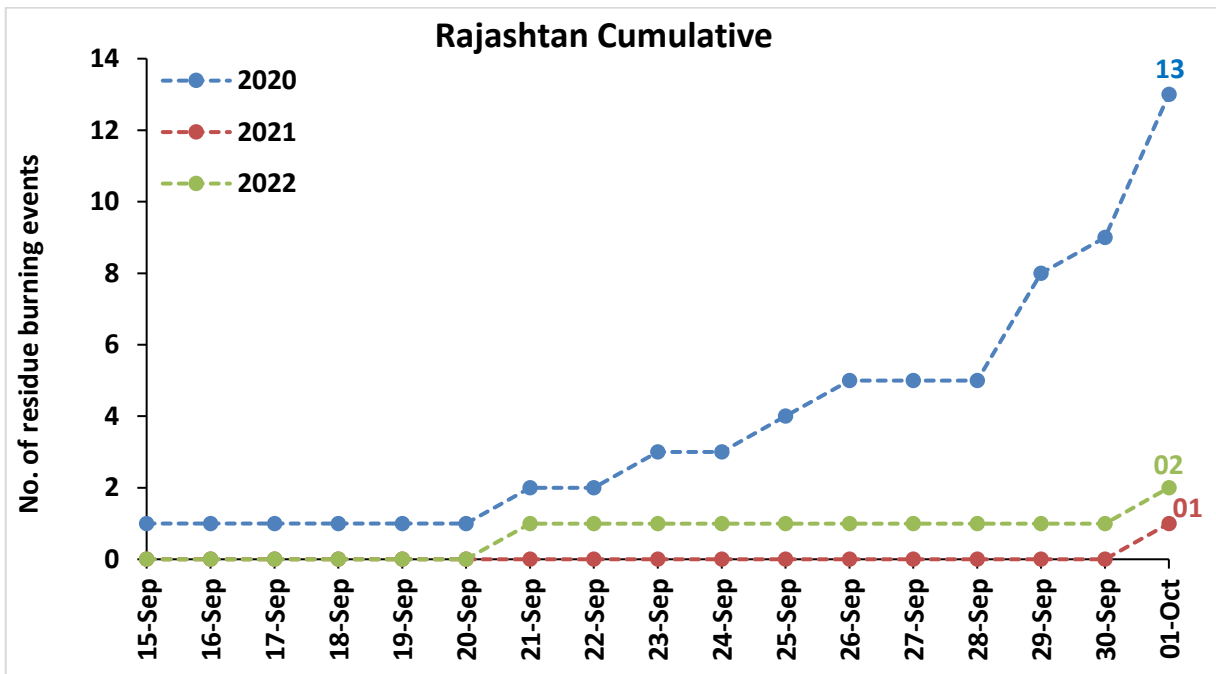
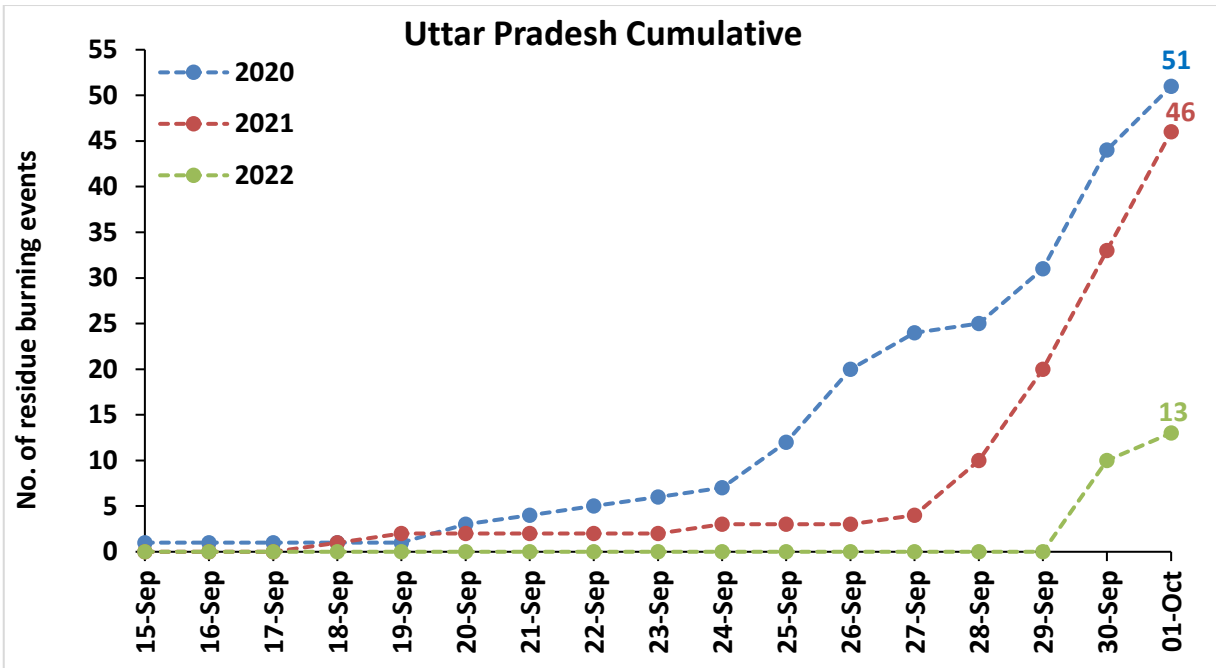
Temporal distribution of rice residue burning events for the study States in 2022

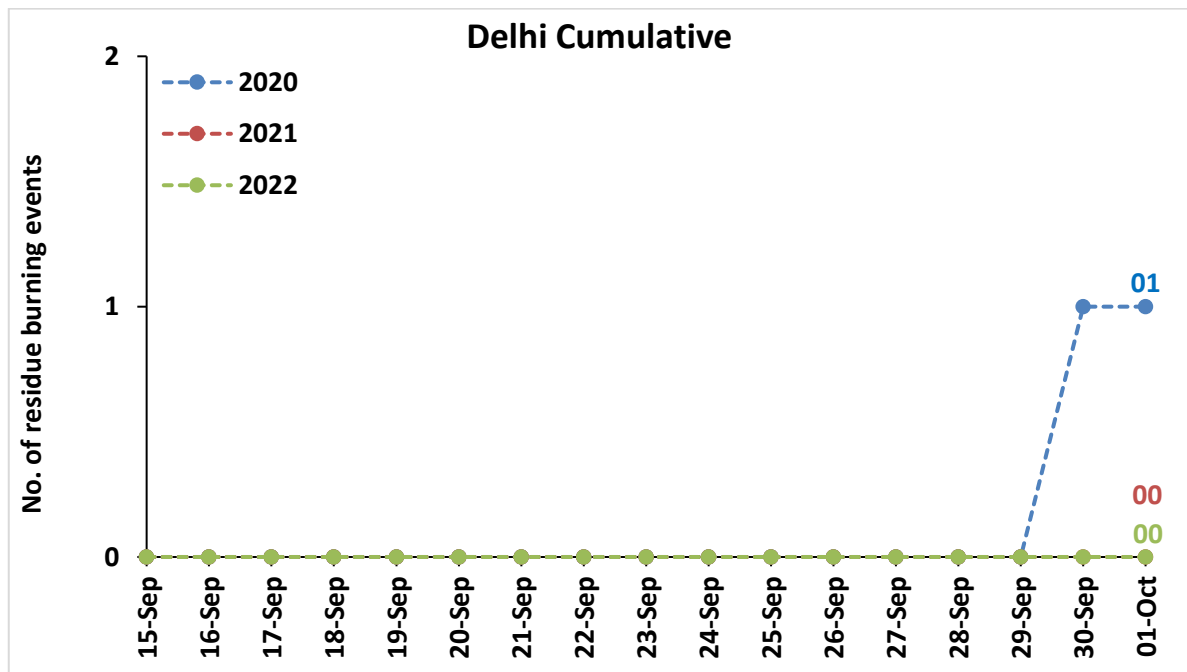
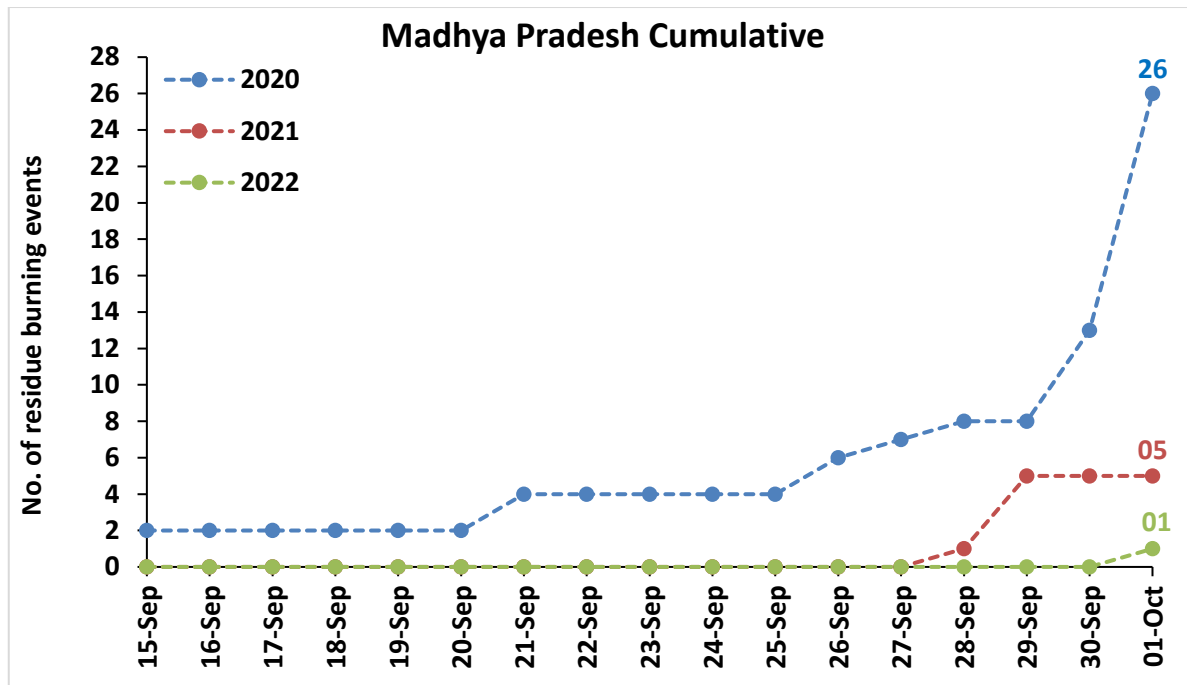




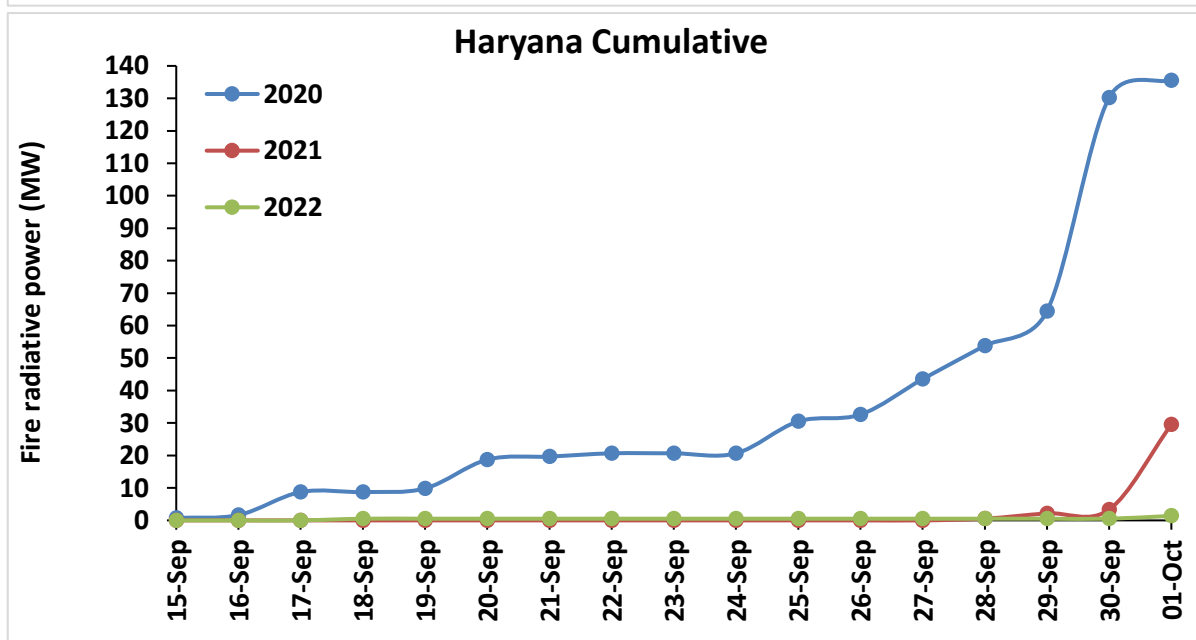
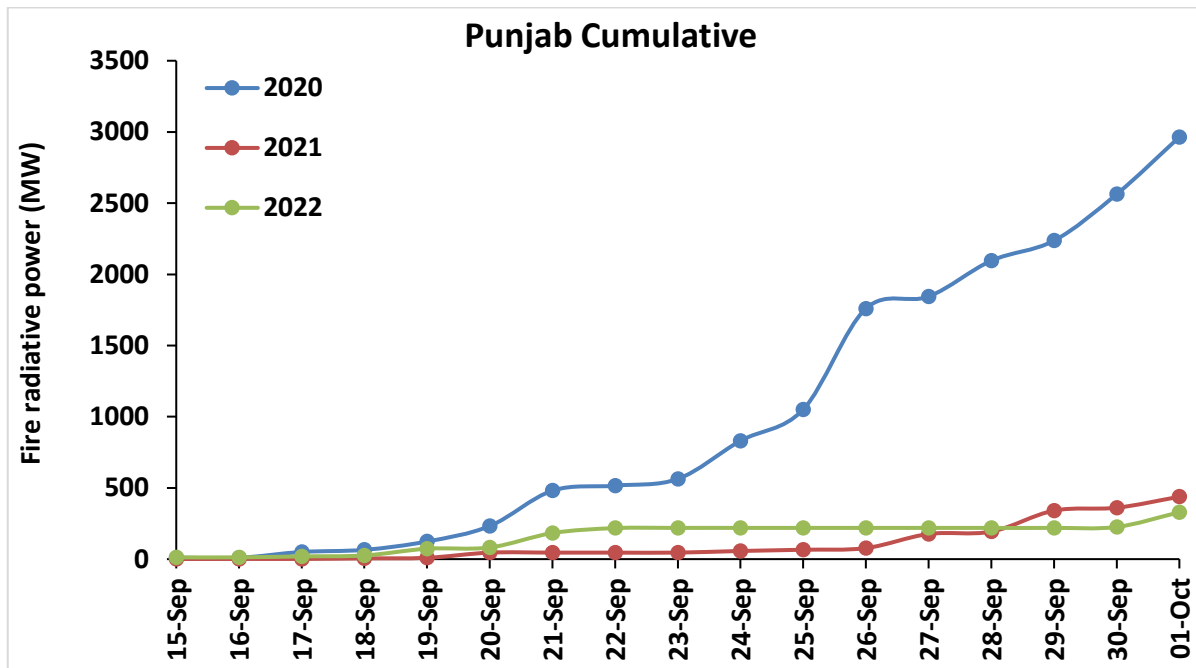
Comparison of residue burning events in current year (2022) with previous years (2020 and 2021) for the study States

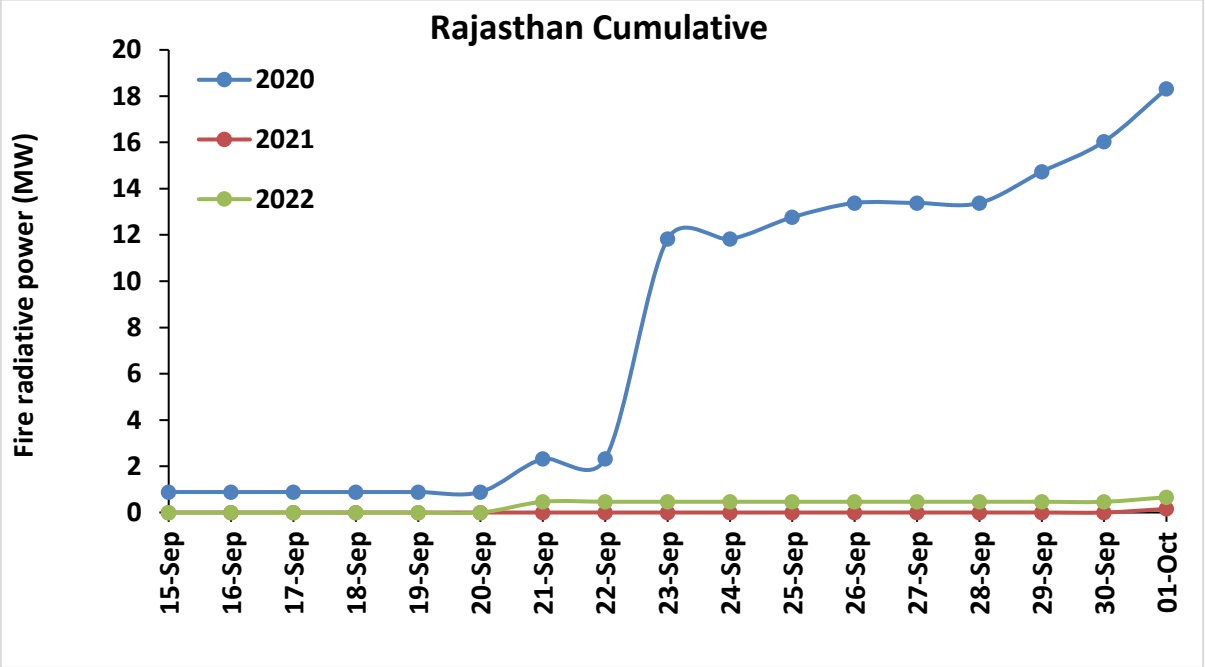
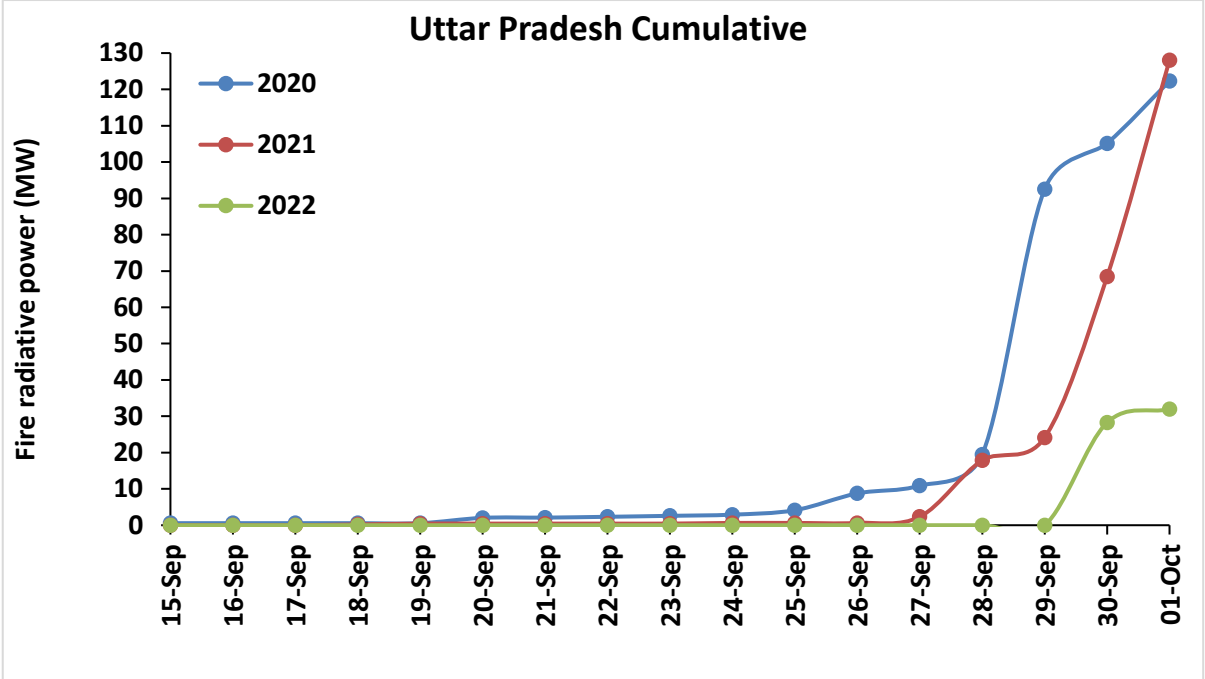


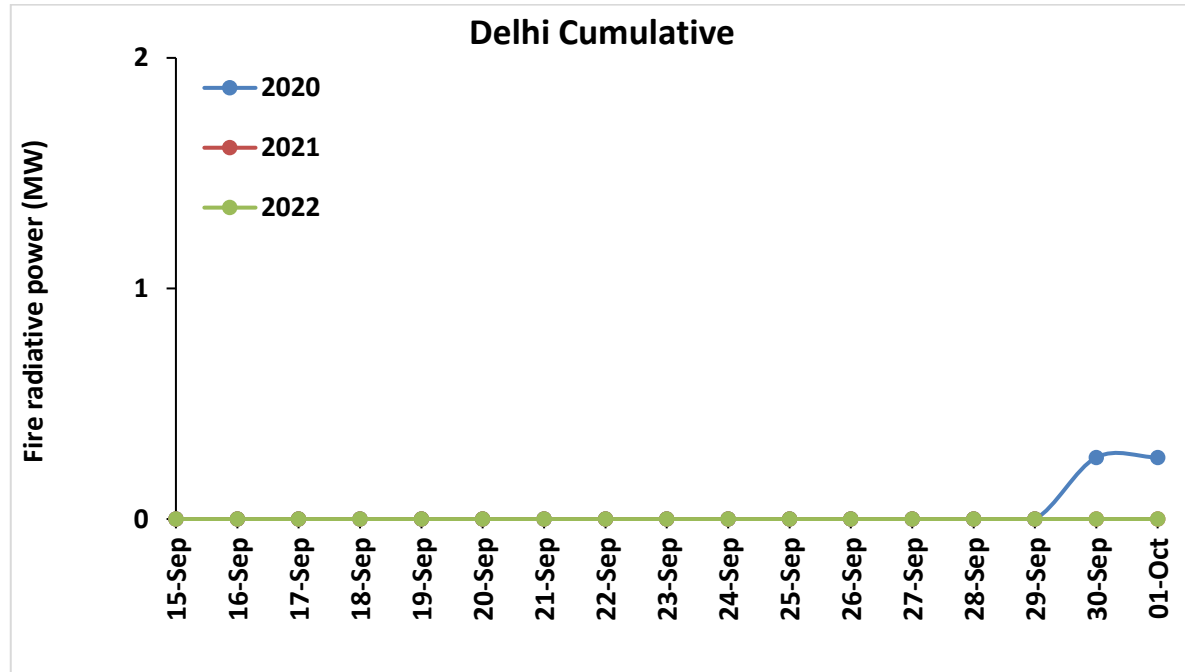
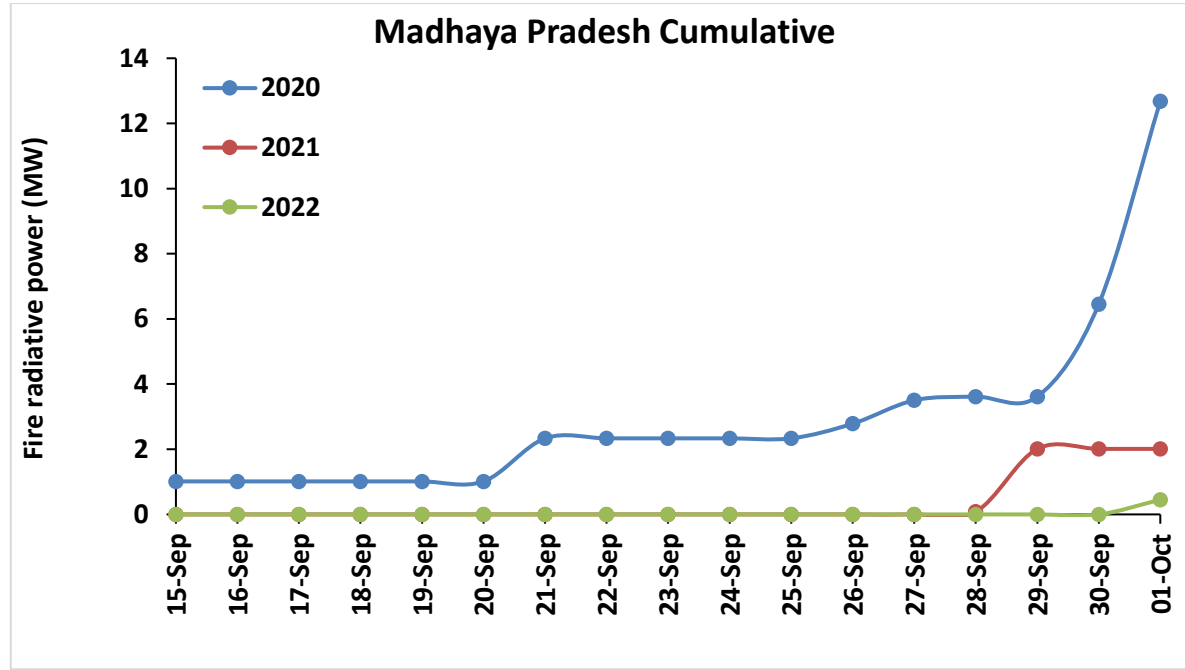




Comparison of residue burning fire power in current year (2022) with previous years (2021 and 2020) for the study States

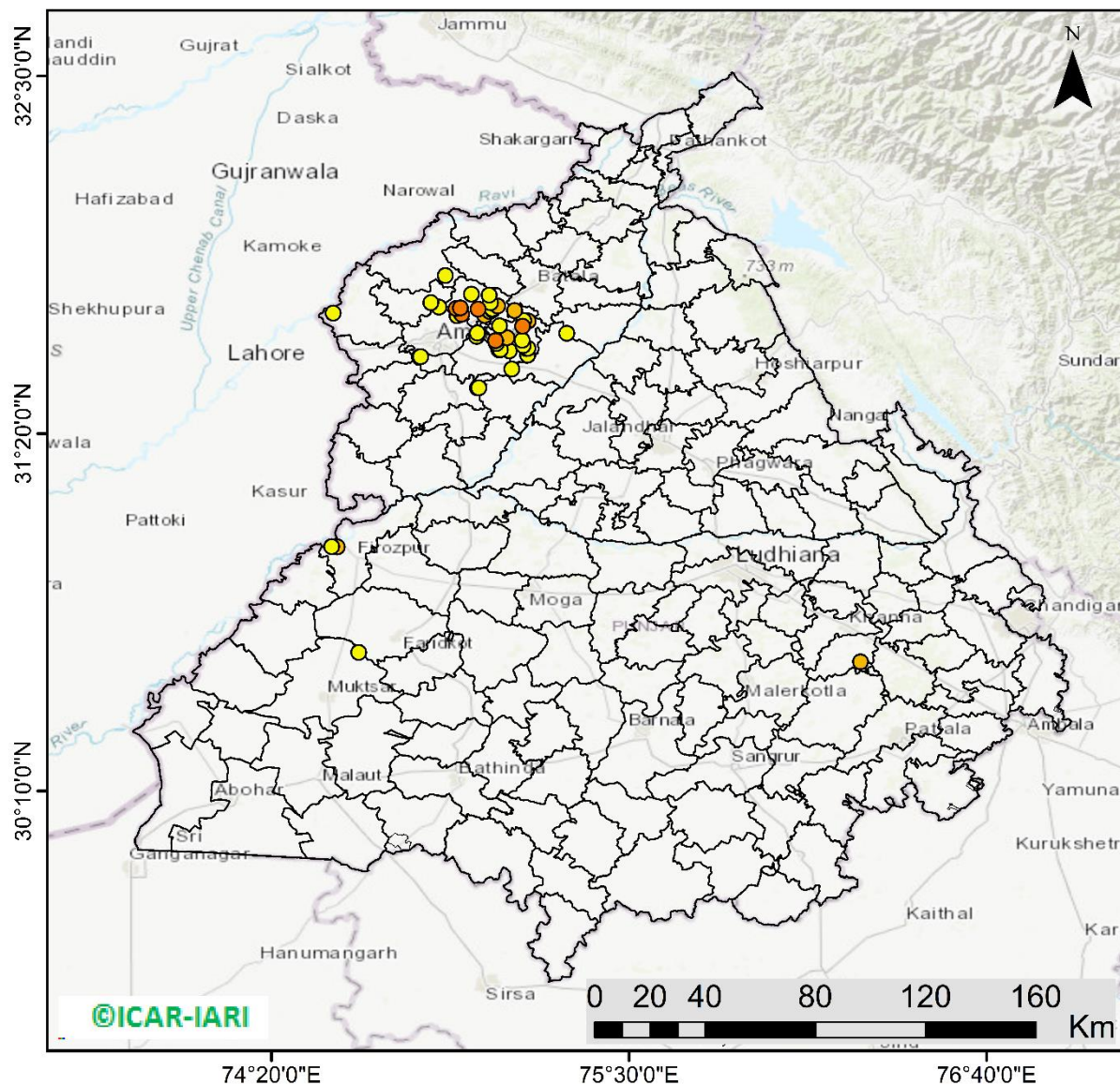






Punjab

RICE RESIDUE BURNING IN PUNJAB



45 burning events detected in Punjab during (01st Oct 2022)

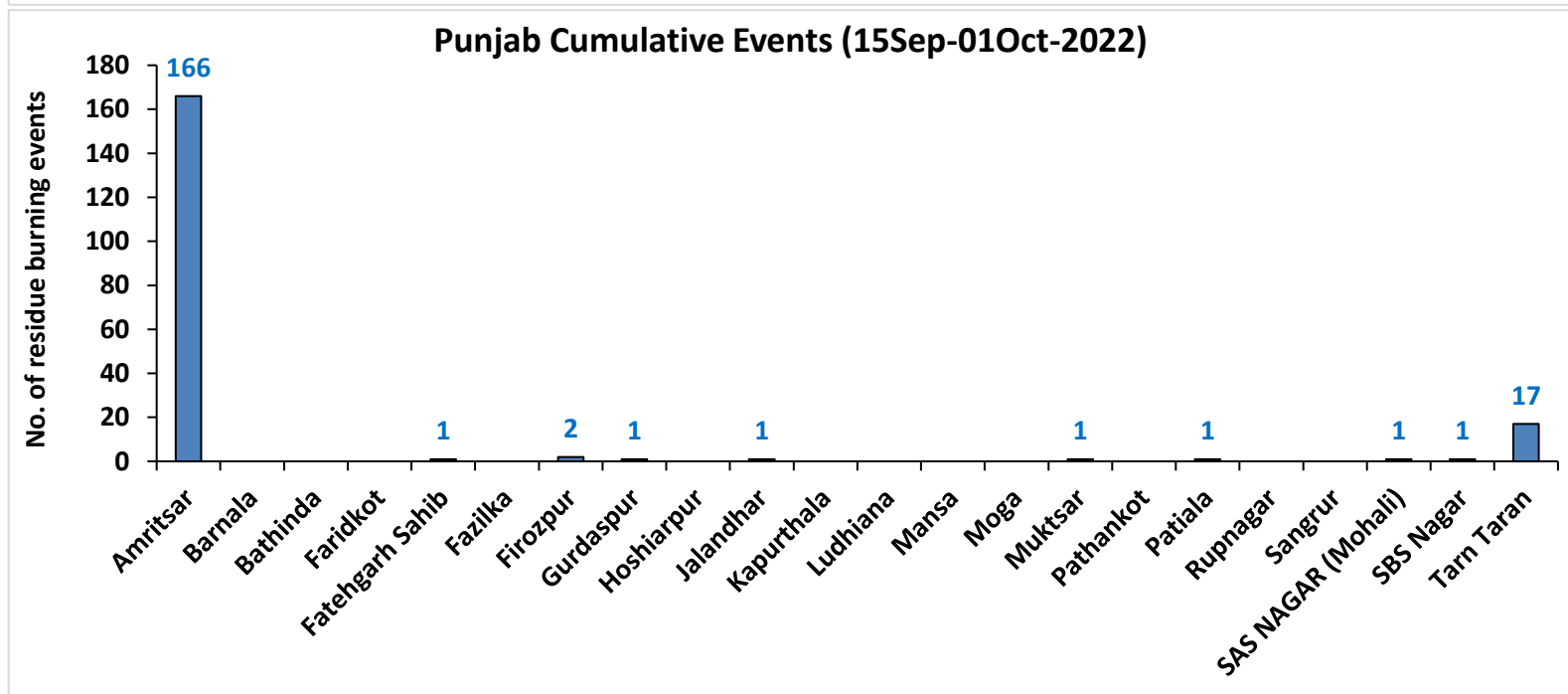
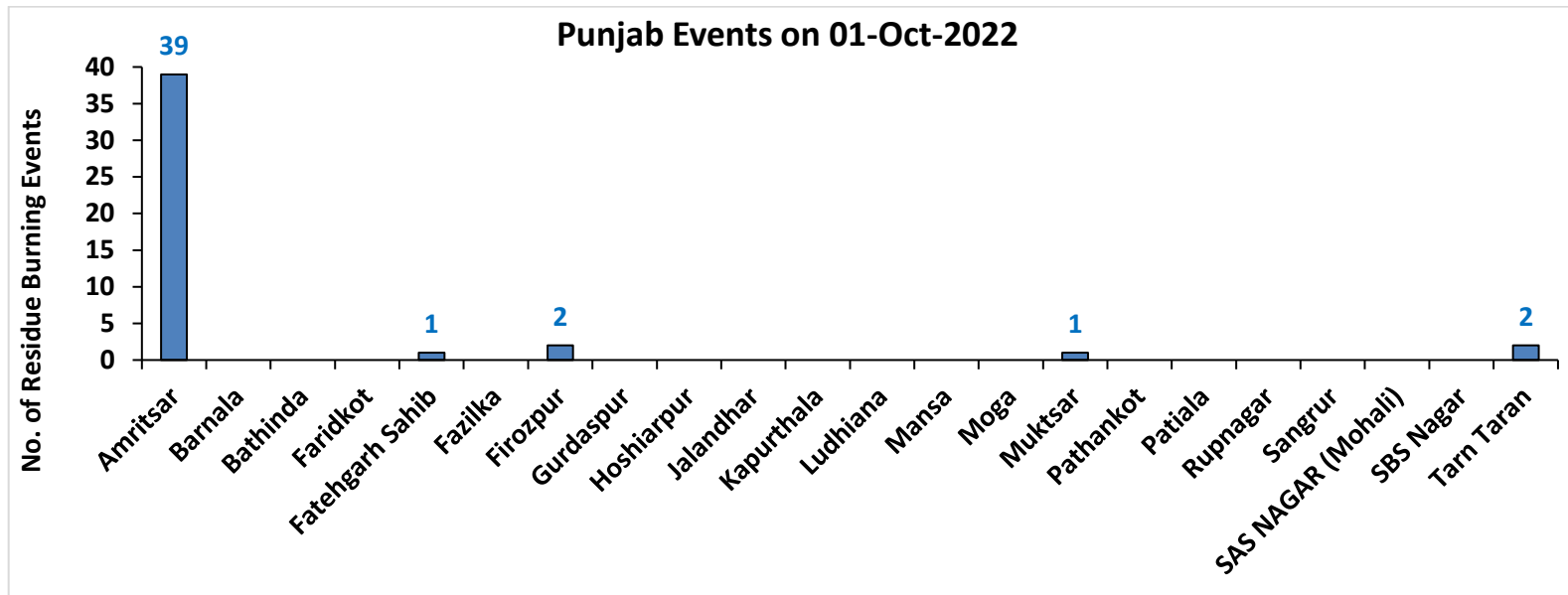
Fire Intensity (W/m²)

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



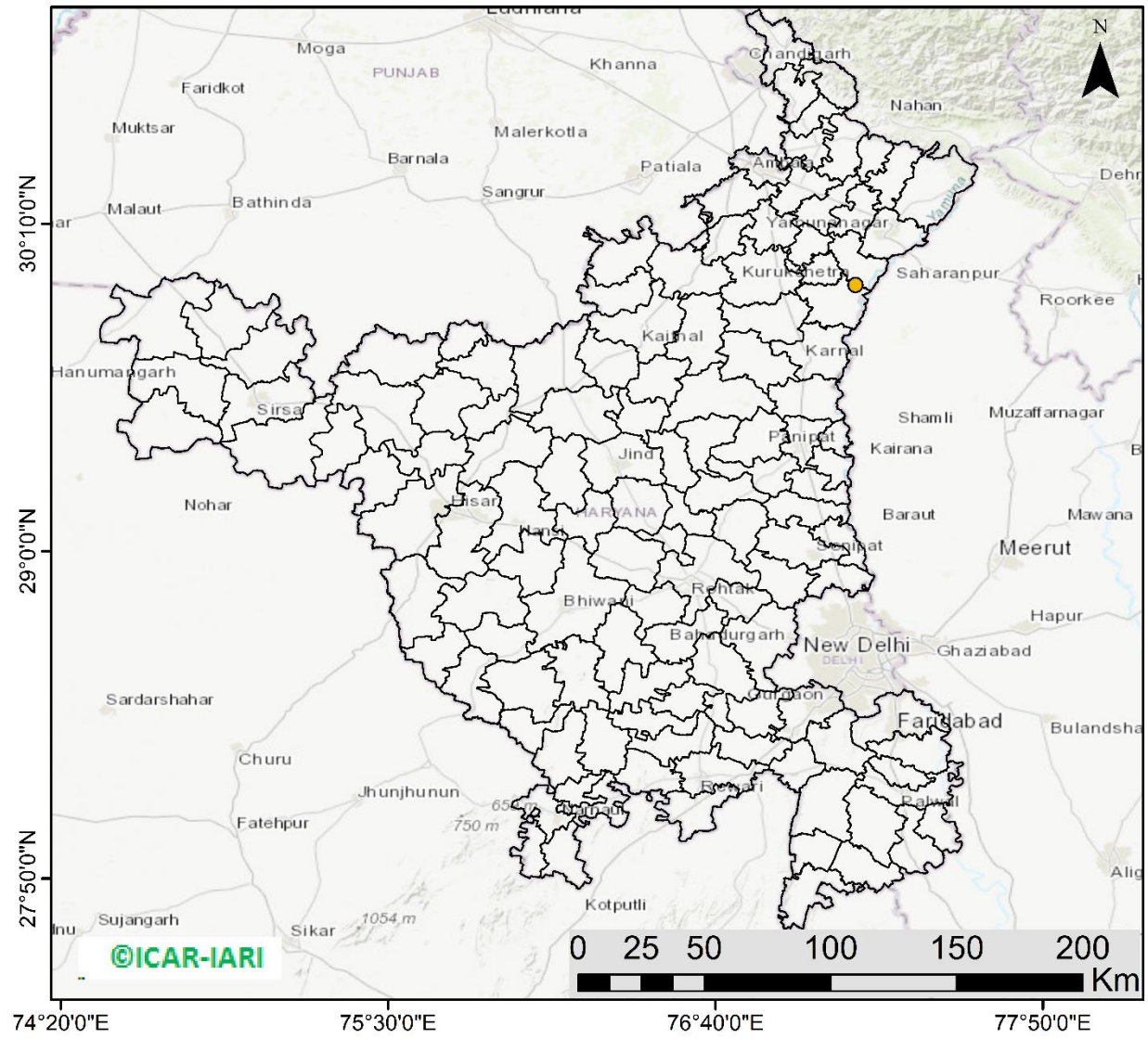
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Punjab (15Sep- 01Oct-2022)



Haryana

RICE RESIDUE BURNING IN HARYANA



01 burning events detected in Haryana on (01st Oct 2022)

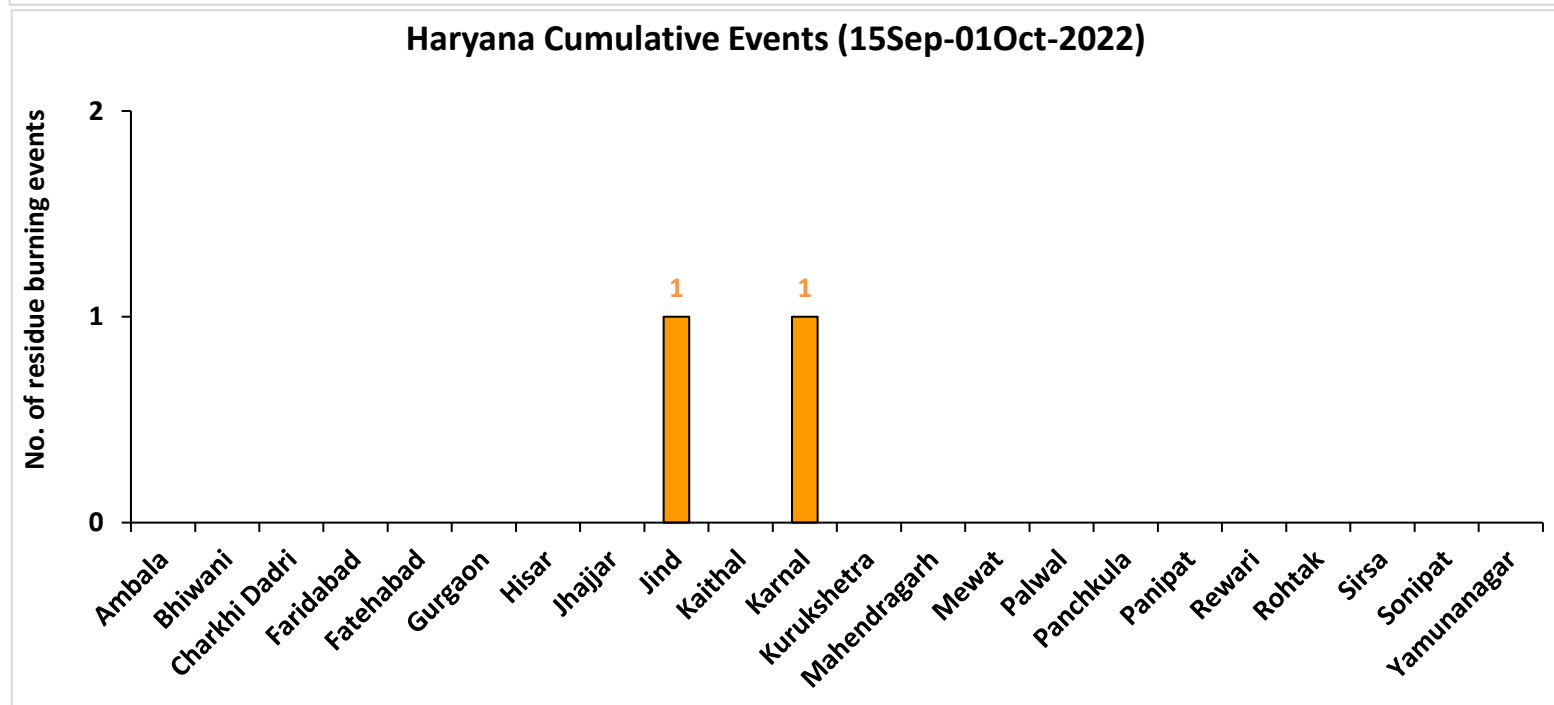
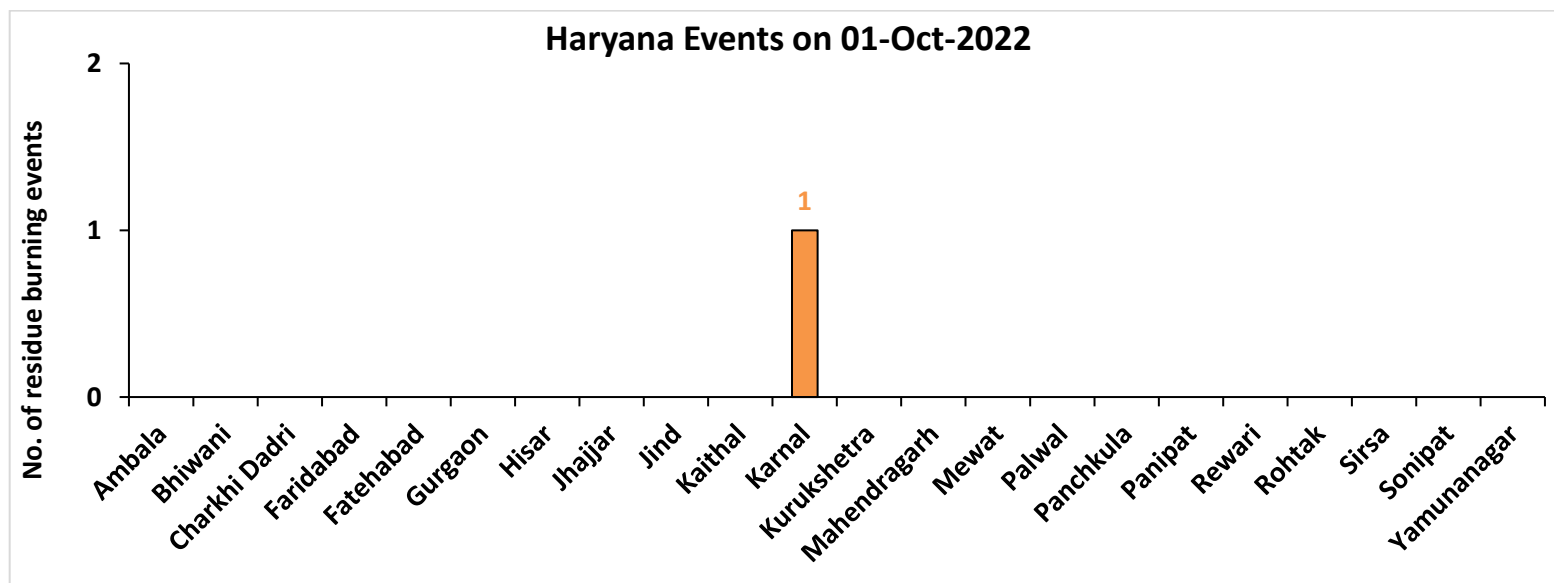
Fire Intensity (W/m²)

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



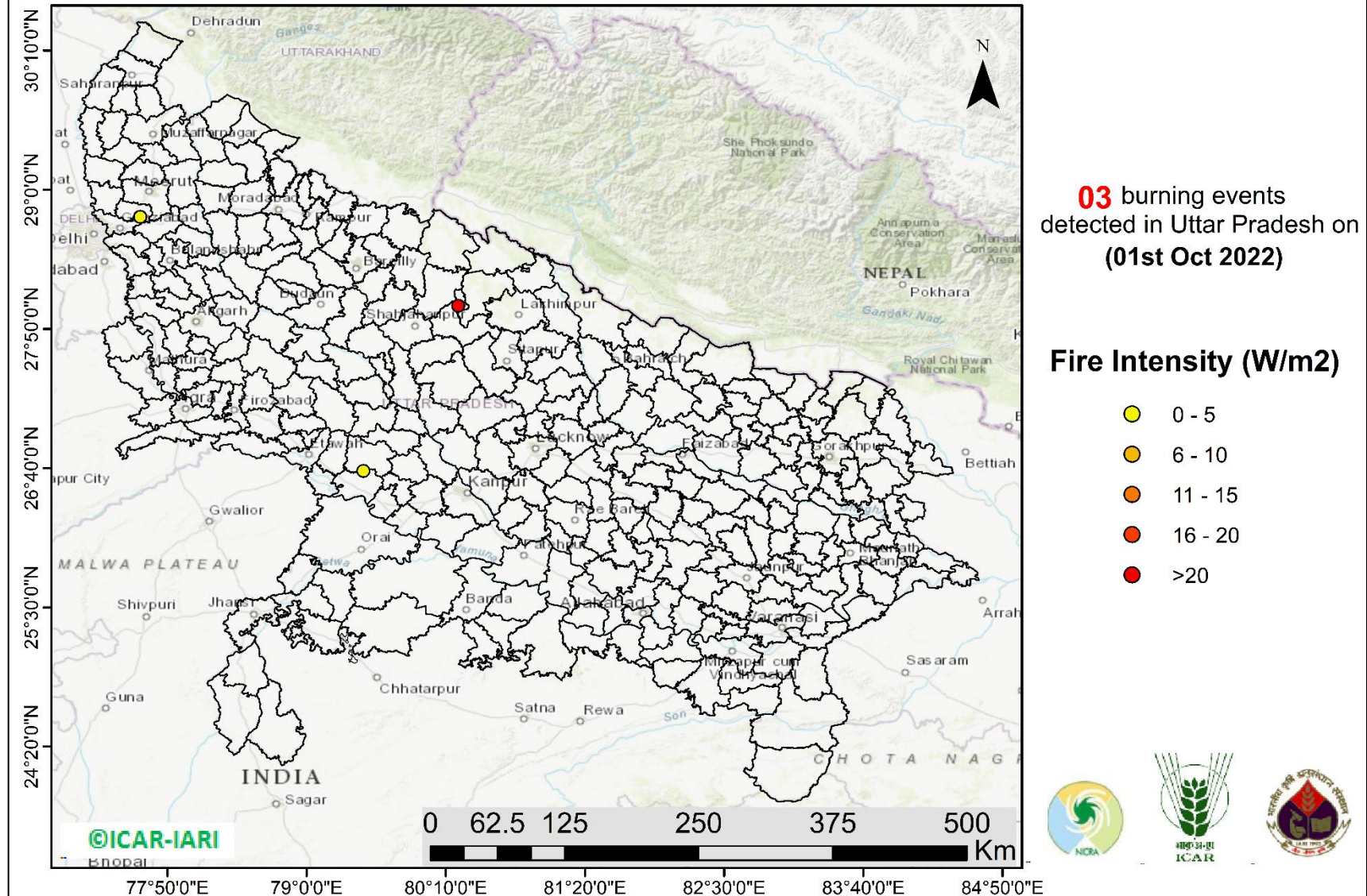
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District-wise cumulative number of residues burning events in Haryana (15Sep- 01Oct-2022)

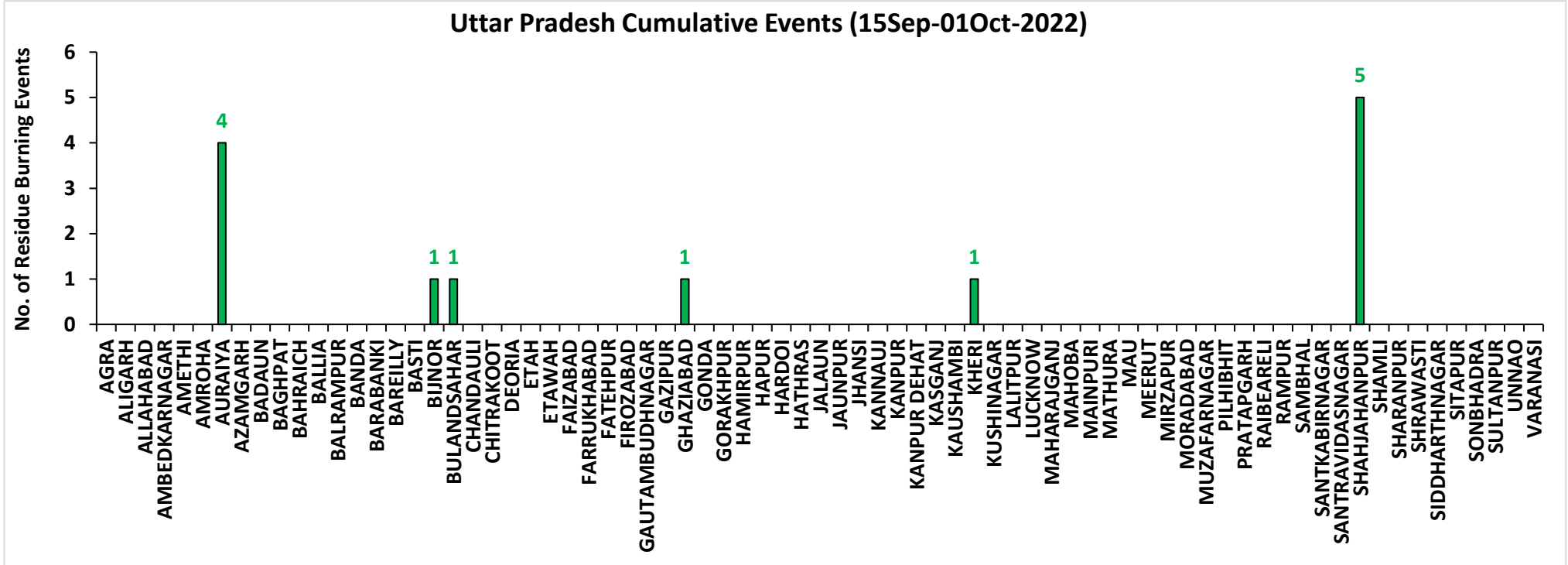
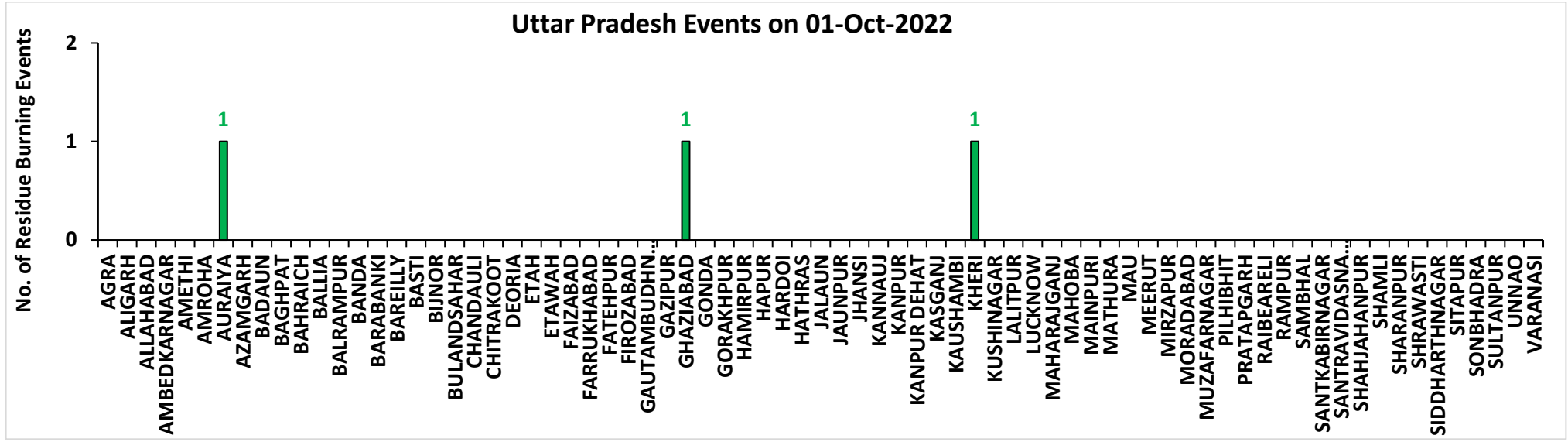


Uttar Pradesh

RICE RESIDUE BURNING IN UTTAR PRADESH

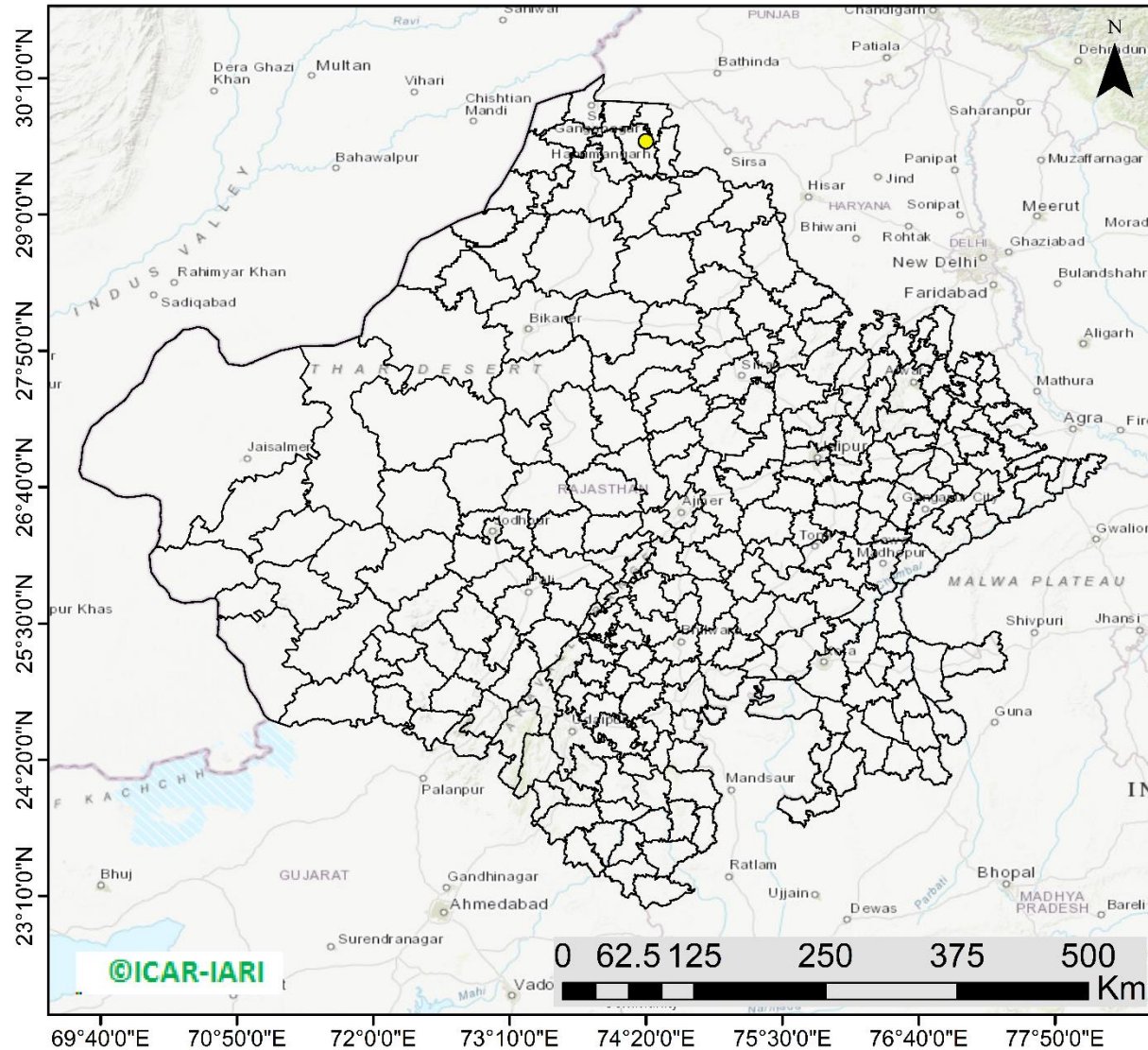


District-wise cumulative number of residues burning events in Uttar Pradesh (15Sep- 01Oct-2022)



Rajasthan

RICE RESIDUE BURNING IN RAJASTHAN



01 burning events detected in Rajasthan on (01st Oct 2022)

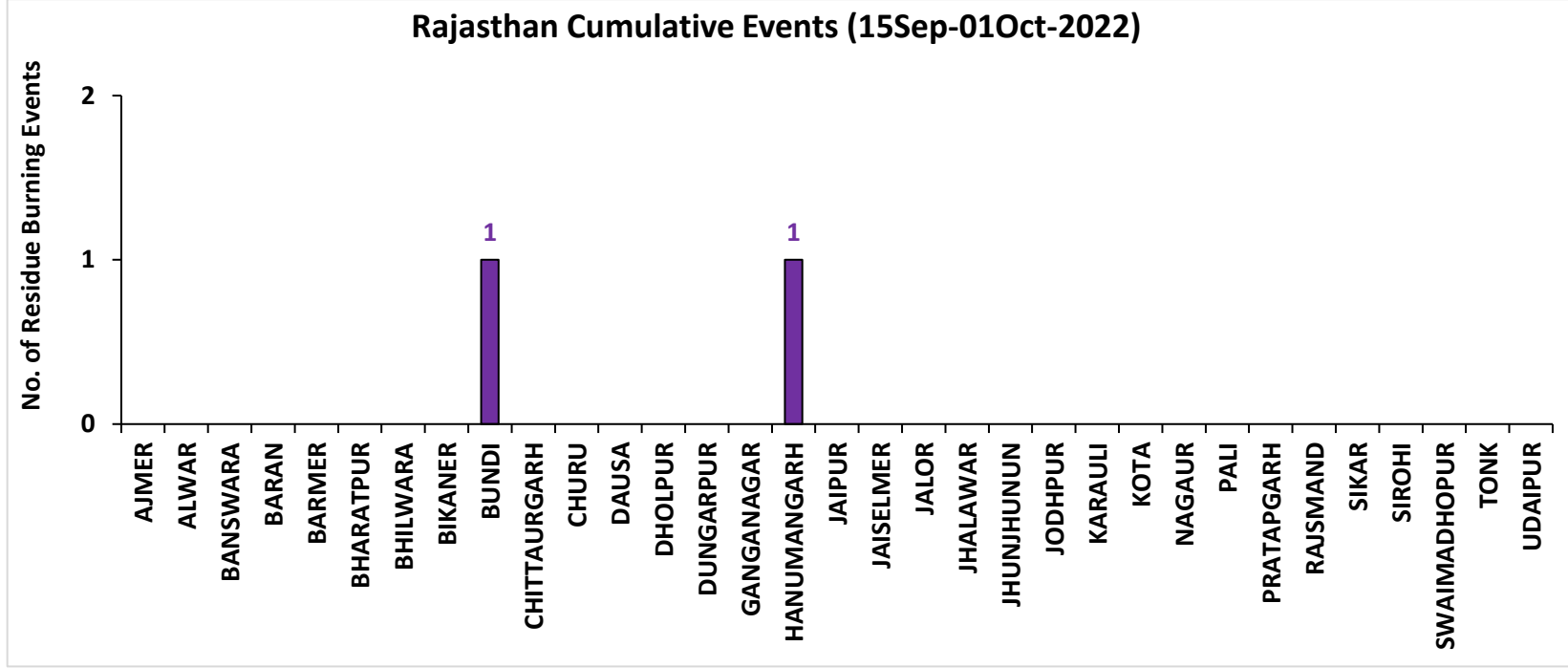
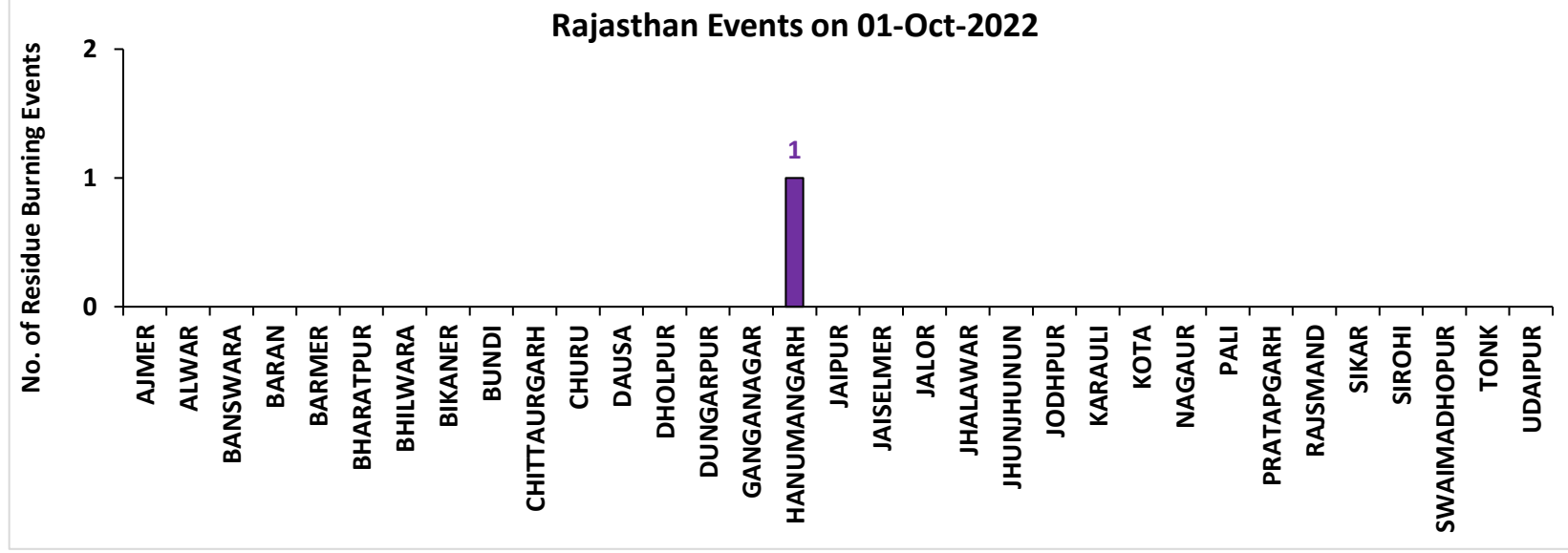
Fire Intensity (W/m²)

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



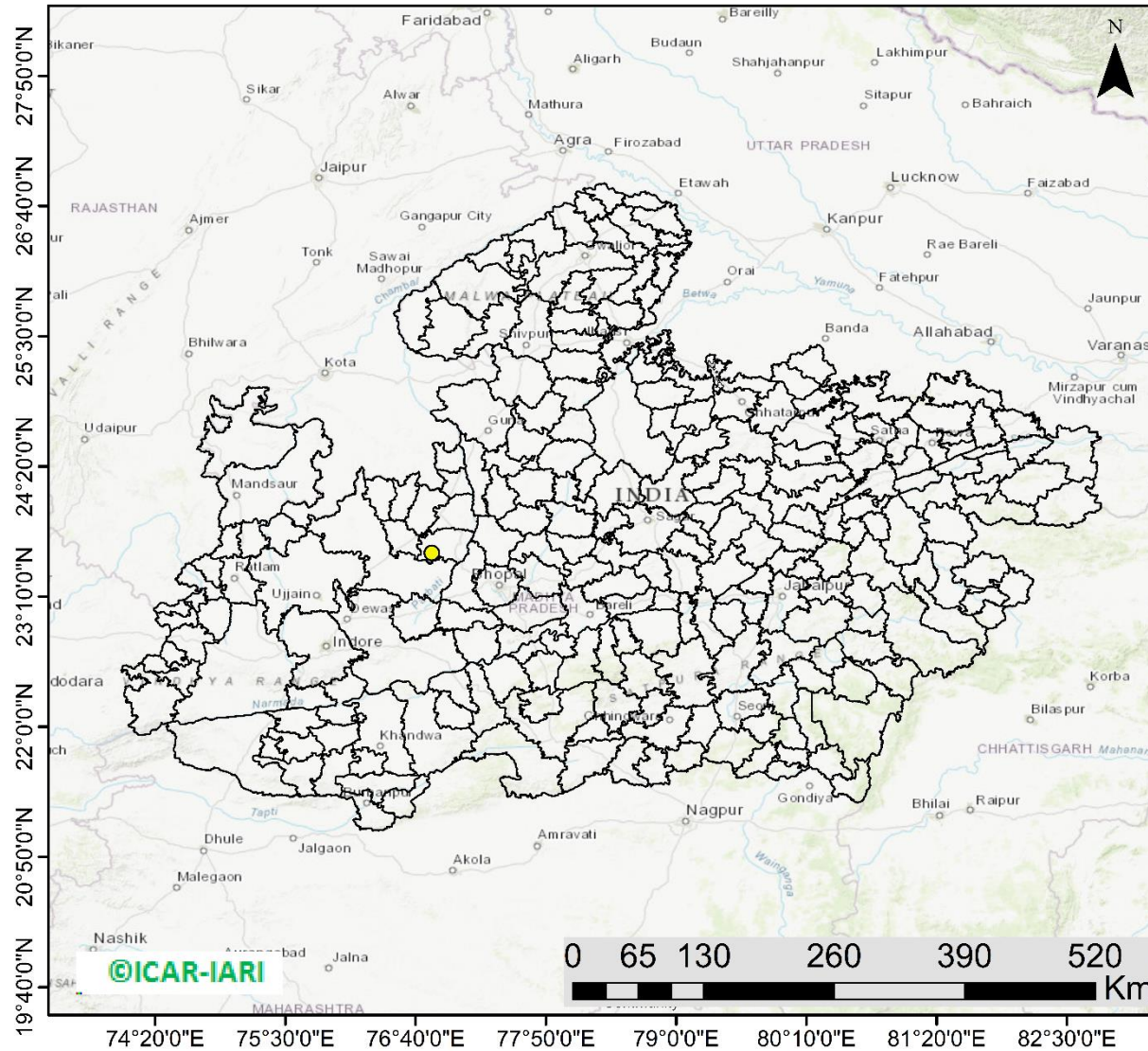
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Rajasthan (15Sep- 01Oct -2022)



Madhya Pradesh

RICE RESIDUE BURNING IN MADHYA PRADESH



01 burning events detected in MP on (01st Oct 2022)

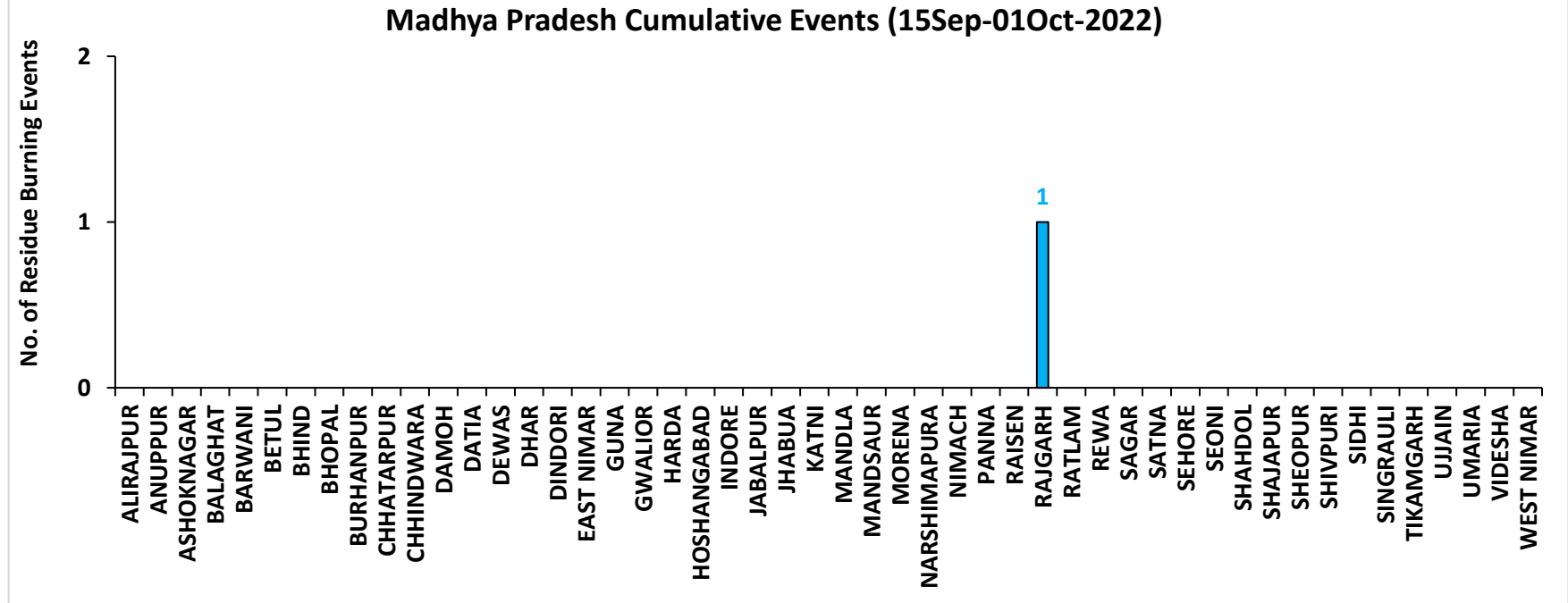
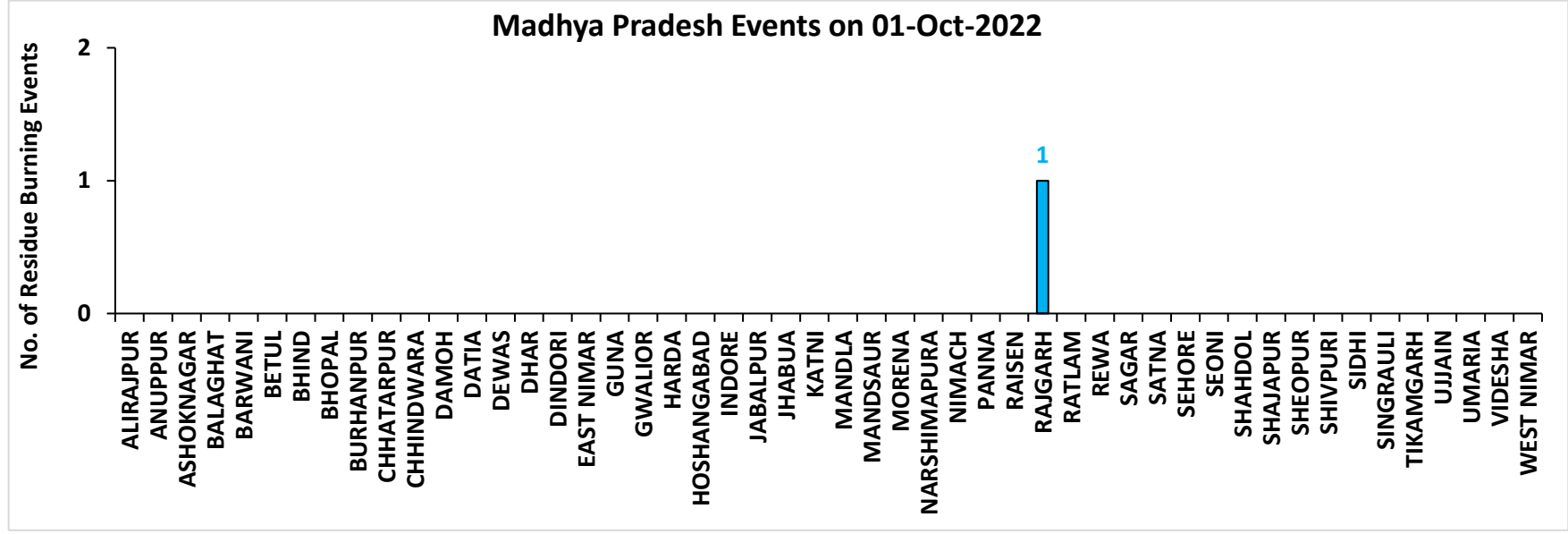
Fire Intensity (W/m²)

- 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 (15Sep- 01Oct -2022)



District-wise cumulative number of residues burning events detected in 2020 ,2021 and 2022
(Period: 15 September-01 October)

(a) Punjab

District	15 Sep-01 Oct 2022		
	2020	2021	2022
Amritsar	827	157	166
Barnala	2	0	0
Bathinda	0	0	0
Faridkot	3	9	0
Fatehgarh Sahib	8	0	1
Fazilka	0	1	0
Firozpur	12	3	2
Gurdaspur	40	4	1
Hoshiarpur	1	0	0
Jalandhar	6	1	1
Kapurthala	10	2	0
Ludhiana	21	7	0
Mansa	1	0	0
Moga	6	0	0
Muktsar	1	0	1
Pathankot	0	0	0
Patiala	34	10	1
Rupnagar	1	0	0
Sangrur	9	3	0
SAS NAGAR (Mohali)	7	0	1
SBS Nagar	1	0	1
Tarn Taran	200	31	17
Total	1190	228	192

(b) Haryana

District	15 Sep-01 Oct 2022		
	2020	2021	2022
AMBALA	13	0	0
BHIWANI	0	0	0
CHARKHI DADRI	0	0	0
FARIDABAD	0	0	0
FATEHABAD	10	0	0
GURGAON	0	0	0
HISAR	2	0	0
JHAJJAR	0	0	0
JIND	0	0	1
KAITHAL	11	1	0
KARNAL	28	2	1
KURUKSHETRA	16	7	0
MAHENDRAGARH	0	0	0
MEWAT	0	0	0
PALWAL	1	0	0
PANCHKULA	0	0	0
PANIPAT	4	0	0
REWARI	0	0	0
ROHTAK	0	0	0
SIRSA	1	0	0
SONIPAT	1	0	0
YAMUNANAGAR	6	1	0
Total	93	11	2

(c) Uttar Pradesh

District	15 Sep-01 Oct 2022										
	2020	2021	2022	GAUTAMBUDHNAGAR	0	0	0	MUZAFARNAGAR	0	0	0
AGRA	0	0	0	GAZIPUR	0	0	0	PILHIBHIT	1	1	0
ALIGARH	3	0	0	GHAZIABAD	1	0	1	PRATAPGARH	0	0	0
ALLAHABAD	0	0	0	GONDA	0	0	0	RAIBEARELI	1	0	0
AMBEDKARNAGAR	0	0	0	GORAKHPUR	0	0	0	RAMPUR	1	3	0
AMETHI	0	0	0	HAMIRPUR	0	0	0	SAMBHAL	4	0	0
AMROHA	0	0	0	HAPUR	1	0	0	SANTKABIRNAGAR	0	0	0
AURAIYA	10	0	4	HARDOI	0	0	0	SANTRAVIDASNAGAR	0	0	0
AZAMGARH	0	0	0	HATHRAS	0	0	0	SHAHJAHANPUR	3	36	5
BADAUN	0	0	0	JALAUN	0	0	0	SHAMLI	6	0	0
BAGHPAT	1	0	0	JAUNPUR	0	0	0	SHARANPUR	3	0	0
BAHRAICH	0	0	0	JHANSI	2	0	0	SHRAWASTI	0	0	0
BALLIA	0	0	0	KANNAUJ	1	0	0	SIDDHARTHANAGAR	0	0	0
BALRAMPUR	0	0	0	KANPUR	0	1	0	SITAPUR	1	0	0
BANDA	0	0	0	KANPUR DEHAT	0	0	0	SONBHADRA	0	0	0
BARABANKI	0	0	0	KASGANJ	0	0	0	SULTANPUR	0	0	0
BAREILLY	0	0	0	KAUSHAMBI	1	0	0	UNNAO	2	0	0
BASTI	0	0	0	KHERI	0	3	1	VARANASI	0	0	0
BIJNOR	1	0	1	KUSHINAGAR	0	0	0	Total	51	46	13
BULANDSAHAR	0	0	1	LALITPUR	0	1	0				
CHANDAULI	0	0	0	LUCKNOW	0	0	0				
CHITRAKOOT	0	0	0	MAHARAJGANJ	0	0	0				
DEORIA	0	0	0	MAHOBA	0	0	0				
ETAH	1	0	0	MAINPURI	0	0	0				
ETAWAH	0	0	0	MATHURA	1	1	0				
FAIZABAD	0	0	0	MAU	0	0	0				
FARRUKHABAD	0	0	0	MEERUT	6	0	0				
FATEHPUR	0	0	0	MIRZAPUR	0	0	0				
FIROZABAD	0	0	0	MORADABAD	0	0	0				

(d) Delhi

District	15 Sep-01 Oct 2022		
	2020	2021	2022
CENTRAL	0	0	0
EAST	0	0	0
NEW DELHI	0	0	0
NORTH	0	0	0
NORTH EAST	0	0	0
NORTH WEST DELHI	0	0	0
SHAHADRA	0	0	0
SOUTH	1	0	0
SOUTH EAST	0	0	0
SOUTH WEST DELHI	0	0	0
WEST DELHI	0	0	0
Total	1	0	0

(e) Rajasthan

District	15 Sep-01 Oct 2022		
	2020	2021	2022
AJMER	0	0	0
ALWAR	1	0	0
BANSWARA	0	0	0
BARAN	4	0	0
BARMER	2	0	0
BHARATPUR	0	0	0
BHILWARA	1	0	0
BIKANER	0	0	0
BUNDI	1	0	1
CHITTAURGARH	0	1	0
CHURU	0	0	0
DAUSA	0	0	0
DHOLPUR	0	0	0
DUNGARPUR	0	0	0
GANGANAGAR	1	0	0
HANUMANGARH	1	0	1
JAIPUR	0	0	0
JAISELMER	1	0	0
JALOR	0	0	0
JHALAWAR	0	0	0
JHUNJHUNUN	0	0	0
JODHPUR	1	0	0
KARALI	0	0	0
KOTA	0	0	0
NAGOUR	0	0	0
PALI	0	0	0
PRATAPGARH	0	0	0
RAJSMAND	0	0	0
SIKAR	0	0	0
SIROHI	0	0	0
SWAIMADHOPUR	0	0	0
TONK	0	0	0
UDAIPUR	0	0	0
Total	13	1	2

(f) Madhya Pradesh

District	15 Sep-01 Oct 2022						
	2020	2021	2022	PANNA	0	0	0
ALIRAJPUR	0	0	0	RAISEN	0	0	0
ANUPPUR	0	0	0	RAJGARH	1	0	1
ASHOKNAGAR	3	0	0	RATLAM	0	0	0
BALAGHAT	0	0	0	REWA	0	0	0
BARWANI	0	0	0	SAGAR	2	2	0
BETUL	0	0	0	SATNA	0	0	0
BHIND	0	0	0	SEHORE	1	0	0
BHOPAL	1	0	0	SEONI	0	0	0
BURHANPUR	0	0	0	SHAHDOL	0	0	0
CHHATARPUR	0	0	0	SHAJAPUR	1	0	0
CHHINDWARA	0	0	0	SHEOPUR	0	0	0
DAMOH	0	0	0	SHIVPURI	0	0	0
DATIA	0	0	0	SIDHI	0	0	0
DEWAS	0	0	0	SINGRAULI	0	0	0
DHAR	0	0	0	TIKAMGARH	0	0	0
DINDORI	0	0	0	UJJAIN	3	0	0
EAST NIMAR	0	0	0	UMARIA	0	0	0
GUNA	4	1	0	VIDESHA	3	1	0
GWALIOR	3	0	0	WEST NIMAR	0	0	0
HARDA	2	1	0	Total	26	5	1
HOSHANGABAD	0	0	0				
INDORE	1	0	0				
JABALPUR	1	0	0				
JHABUA	0	0	0				
KATNI	0	0	0				
MANDLA	0	0	0				
MANDSAUR	0	0	0				
MORENA	0	0	0				
NARSHIMAPURA	0	0	0				
NIMACH	0	0	0				

State-wise and date-wise number of paddy residue burning events detected in 2020, 2021 and 2022
(Period: 15 September- 01 October 2022)

Number of Paddy Residue Burning Events Detected																		
	Punjab			Haryana			Uttar Pradesh			Delhi			Rajasthan			Madhya Pradesh		
	2020	2021	2022	2020	2021	2022	2020	2021	2022	2020	2021	2022	2020	2021	2022	2020	2021	2022
15-Sep	5	0	14	2	0	0	1	0	0	0	0	0	1	0	0	2	0	0
16-Sep	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Sep	5	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep	17	9	7	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
19-Sep	30	5	18	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0
20-Sep	67	8	10	6	0	0	2	0	0	0	0	0	0	0	0	0	0	0
21-Sep	54	0	56	2	0	0	1	0	0	0	0	0	1	0	1	2	0	0
22-Sep	34	0	30	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
23-Sep	49	0	3	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
24-Sep	78	5	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
25-Sep	184	11	0	11	0	0	5	0	0	0	0	0	1	0	0	0	0	0
26-Sep	190	19	0	5	0	0	8	0	0	0	0	0	1	0	0	2	0	0
27-Sep	78	37	0	8	0	0	4	1	0	0	0	0	0	0	0	1	0	0
28-Sep	55	28	0	6	1	0	1	6	0	0	0	0	0	0	0	1	1	0
29-Sep	63	64	0	9	4	0	6	10	0	0	0	0	3	0	0	0	4	0
30-Sep	116	27	8	22	2	0	13	13	10	1	0	0	1	0	0	5	0	0
01-Oct	165	13	45	15	4	1	7	13	3	0	0	0	4	1	1	13	0	1
Total	1190	228	192	93	11	2	51	46	13	1	0	0	13	1	2	26	5	1

Details of residue burning events in Punjab on 01-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	AMRITSAR	AJNALA	S-NPP	31.84850	74.90090	13:42:14	D	2.40
2	AMRITSAR	ATTARI	S-NPP	31.58320	74.81570	13:42:14	D	3.40
3	AMRITSAR	ATTARI	S-NPP	31.58380	74.82030	13:42:14	D	3.50
4	AMRITSAR	CHOGAWAN	S-NPP	31.72610	74.53480	13:42:14	D	2.10
5	AMRITSAR	HARSHA CHHINA	S-NPP	31.76030	74.85380	13:42:14	D	3.90
6	AMRITSAR	JANDIALA GURU	S-NPP	31.54340	75.11800	13:42:14	D	4.30
7	AMRITSAR	JANDIALA GURU	S-NPP	31.60600	75.07570	13:42:14	D	5.10
8	AMRITSAR	JANDIALA GURU	S-NPP	31.60660	75.08030	13:42:14	D	3.40
9	AMRITSAR	JANDIALA GURU	S-NPP	31.64990	75.00290	13:42:14	D	3.60
10	AMRITSAR	JANDIALA GURU	S-NPP	31.66110	75.00570	13:42:14	D	2.70
11	AMRITSAR	MAJITHA	S-NPP	31.68470	75.07780	13:42:14	D	2.00
12	AMRITSAR	MAJITHA	S-NPP	31.71750	74.93900	13:42:14	D	4.60
13	AMRITSAR	MAJITHA	S-NPP	31.71830	75.02910	13:42:14	D	5.50
14	AMRITSAR	MAJITHA	S-NPP	31.73130	75.04590	13:42:14	D	2.60
15	AMRITSAR	MAJITHA	S-NPP	31.73600	75.05460	13:42:14	D	3.50
16	AMRITSAR	MAJITHA	S-NPP	31.73960	75.05400	13:42:14	D	4.40
17	AMRITSAR	MAJITHA	S-NPP	31.74910	75.07140	13:42:14	D	9.20
18	AMRITSAR	MAJITHA	S-NPP	31.75970	75.04820	13:42:14	D	4.40
19	AMRITSAR	MAJITHA	S-NPP	31.78450	75.04390	13:42:14	D	2.90
20	AMRITSAR	MAJITHA	S-NPP	31.78800	74.98610	13:42:14	D	3.80
21	AMRITSAR	MAJITHA	AQUA	31.72200	74.95400	14:02:23	D	14.70
22	AMRITSAR	MAJITHA	AQUA	31.73900	75.00800	14:02:23	D	12.10
23	AMRITSAR	MAJITHA	AQUA	31.74100	74.93600	14:02:23	D	14.70
24	AMRITSAR	MAJITHA	AQUA	31.74300	74.95000	14:02:23	D	10.10
25	AMRITSAR	RAYYA	S-NPP	31.65980	75.29740	13:42:14	D	3.00
26	AMRITSAR	TARSIKKA	S-NPP	31.58890	75.16950	13:42:14	D	2.70
27	AMRITSAR	TARSIKKA	S-NPP	31.60310	75.10960	13:42:14	D	3.10
28	AMRITSAR	TARSIKKA	S-NPP	31.61020	75.16580	13:42:14	D	5.00
29	AMRITSAR	TARSIKKA	S-NPP	31.61080	75.17050	13:42:14	D	5.00
30	AMRITSAR	TARSIKKA	S-NPP	31.61970	75.15460	13:42:14	D	4.30

31	AMRITSAR	TARSIKKA	S-NPP	31.62660	75.06730	13:42:14	D	2.30
32	AMRITSAR	TARSIKKA	S-NPP	31.63750	75.15150	13:42:14	D	2.80
33	AMRITSAR	TARSIKKA	S-NPP	31.64560	75.10220	13:42:14	D	5.10
34	AMRITSAR	TARSIKKA	S-NPP	31.70010	75.17110	13:42:14	D	5.90
35	AMRITSAR	TARSIKKA	S-NPP	31.70190	75.15640	13:42:14	D	4.70
36	AMRITSAR	TARSIKKA	S-NPP	31.73440	75.12670	13:42:14	D	5.50
37	AMRITSAR	TARSIKKA	AQUA	31.63600	75.06500	14:02:23	D	10.20
38	AMRITSAR	TARSIKKA	AQUA	31.68300	75.15300	14:02:23	D	13.20
39	AMRITSAR	VERKA	S-NPP	31.74560	74.87990	13:42:14	D	3.00
40	FATEHGARH SAHIB	AMLOH	TERRA	30.58800	76.25600	11:19:05	D	7.20
41	FIROZPUR	FIROZPUR	S-NPP	30.96270	74.54800	13:42:14	D	5.20
42	FIROZPUR	FIROZPUR	S-NPP	30.96380	74.52990	13:42:14	D	3.20
43	MUKTSAR	MUKTSAR	S-NPP	30.61870	74.61800	13:42:14	D	2.80
44	TARN TARAN	TARN TARAN	S-NPP	31.48180	75.00540	13:42:14	D	3.40
45	TARN TARAN	TARN TARAN	S-NPP	31.48240	75.01000	13:42:14	D	3.40

Details of residue burning events in Haryana on 01-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	KARNAL	INDRI	S-NPP	29.94810	77.16600	13:42:14	D	6.20

Details of residue burning events in Uttar Pradesh on 01-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	AURAIYA	BIDHUNA	S-NPP	26.64260	79.47660	13:42:14	D	4.90
2	GHAZIABAD	MODINAGAR	S-NPP	28.77170	77.60600	02:32:14	N	0.80
3	KHERI	MOHMADI	S-NPP	28.02700	80.27160	13:42:14	D	20.50

Details of residue burning events in Rajasthan on 01-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	HANUMANGARH	HANUMANGARH	S-NPP	29.62600	74.33360	13:42:14	D	1.40

Details of residue burning events in Madhya Pradesh on 01-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	RAJGARH	NARSINGHGAR	S-NPP	23.55710	76.81220	13:42:14	D	3.20

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)

and on IARI CREAMS website (<http://creams.iari.res.in/cms2/index.php>)
