



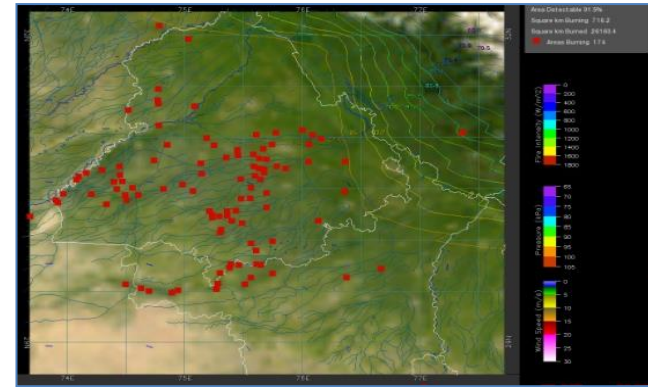
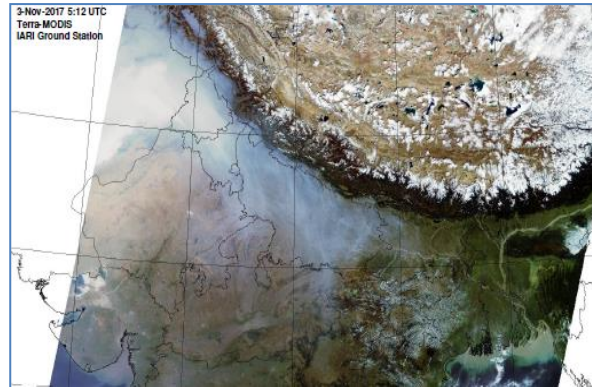
**Bulletin
No. 20**

**Events Date:
04-Oct-2022**

**Issued on:
04-Oct-2022**



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



Prepared by:

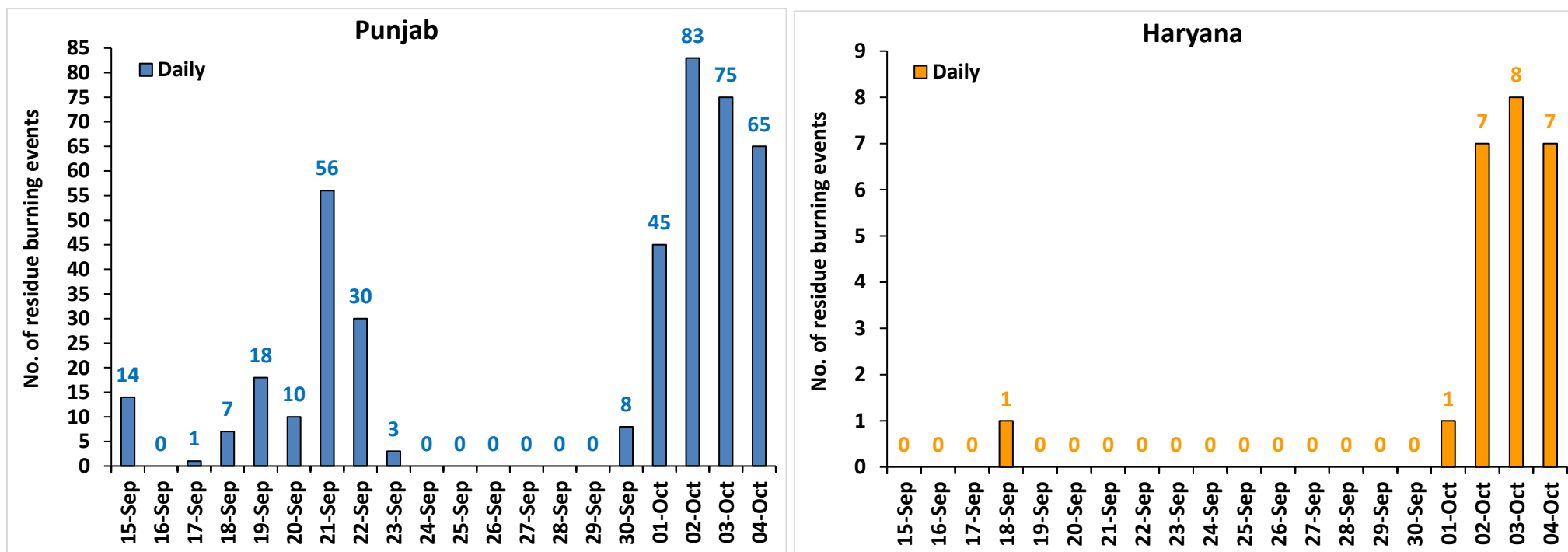
**Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012**

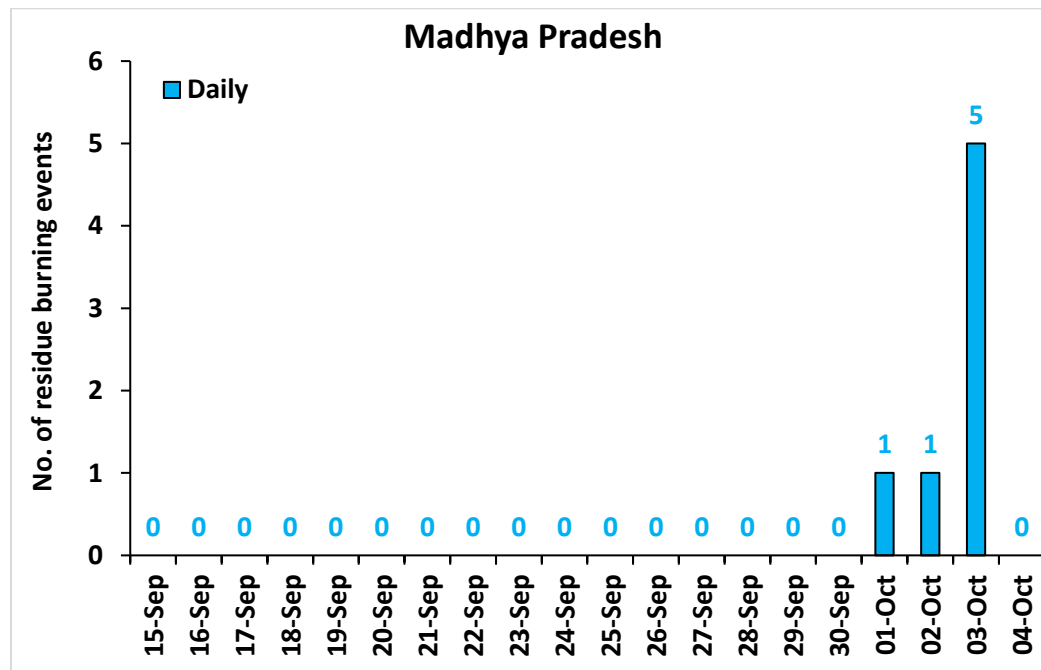
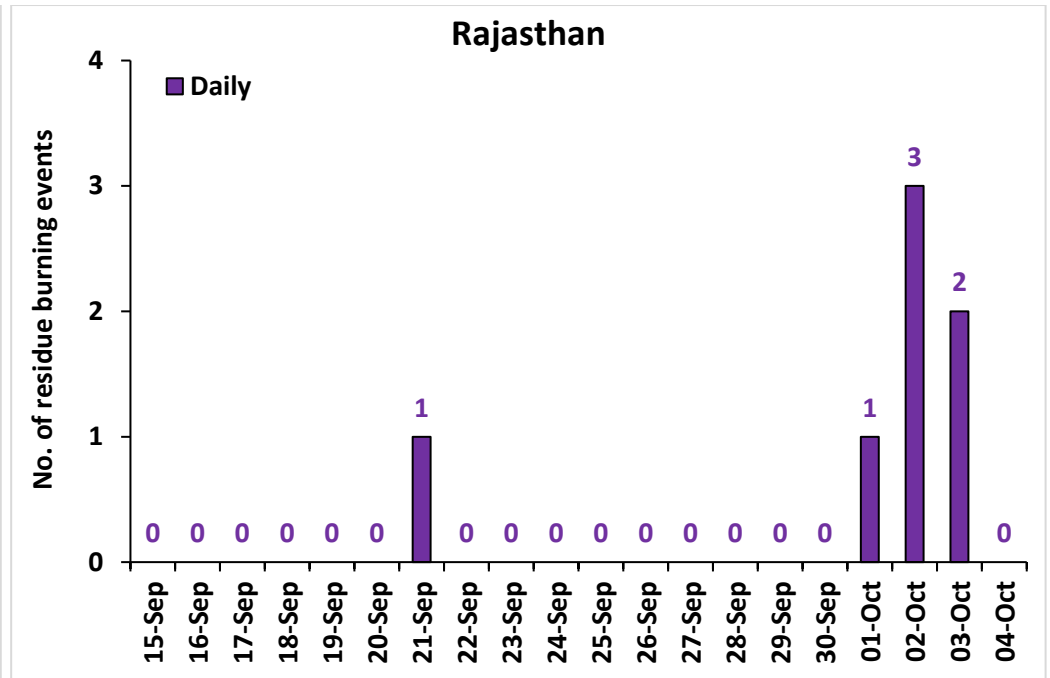
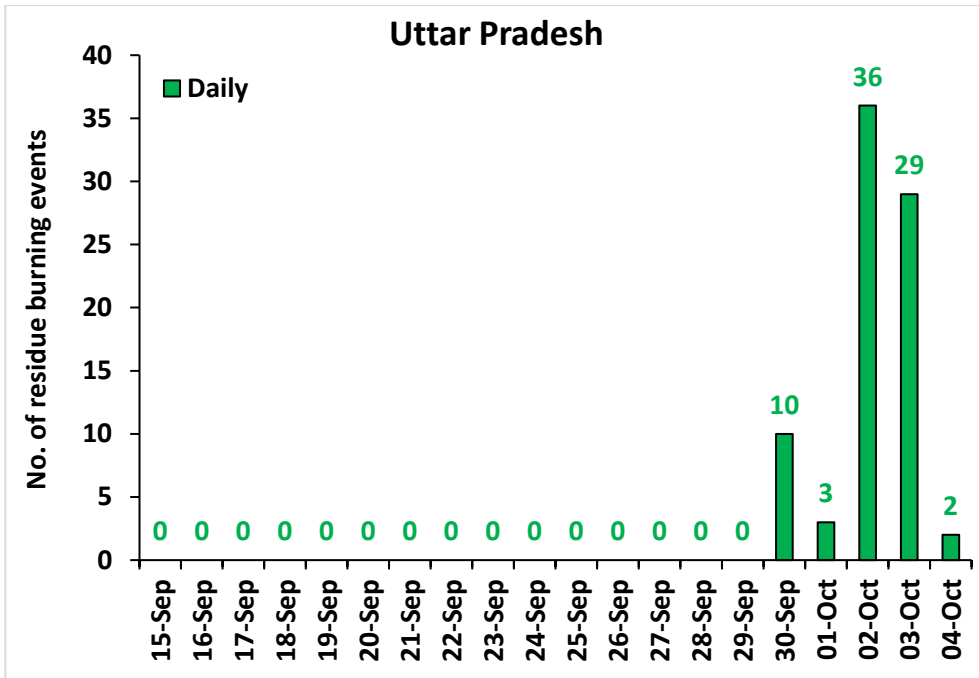
<http://creams.iari.res.in>

Highlights for 04-Oct-2022

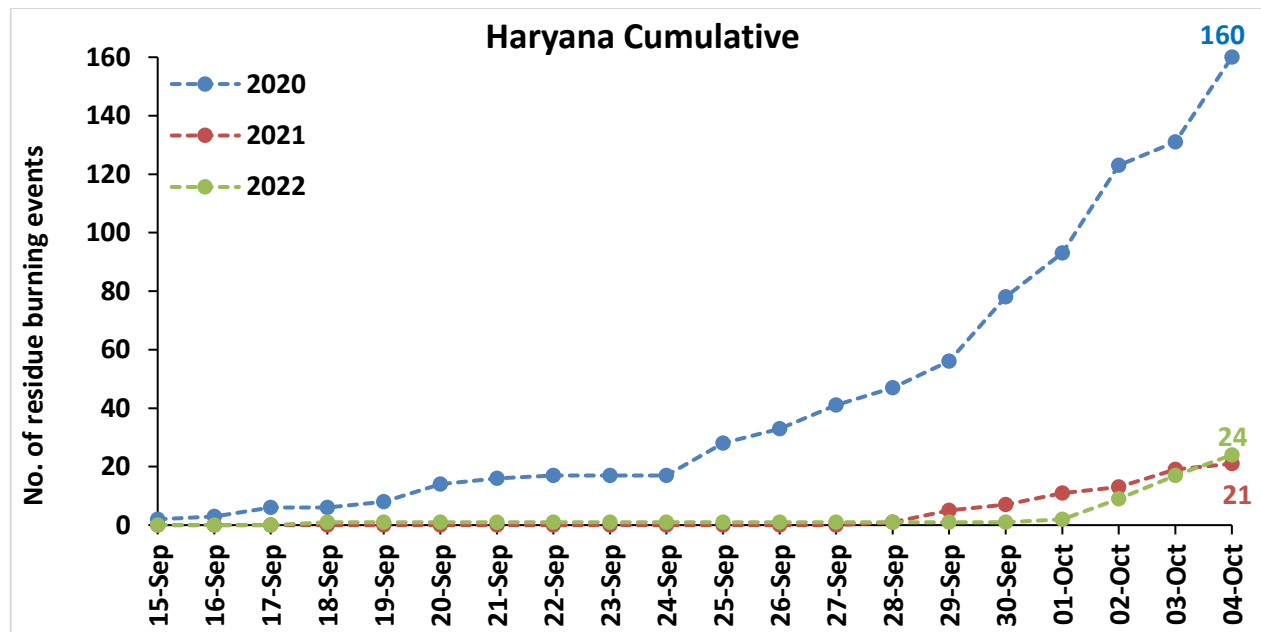
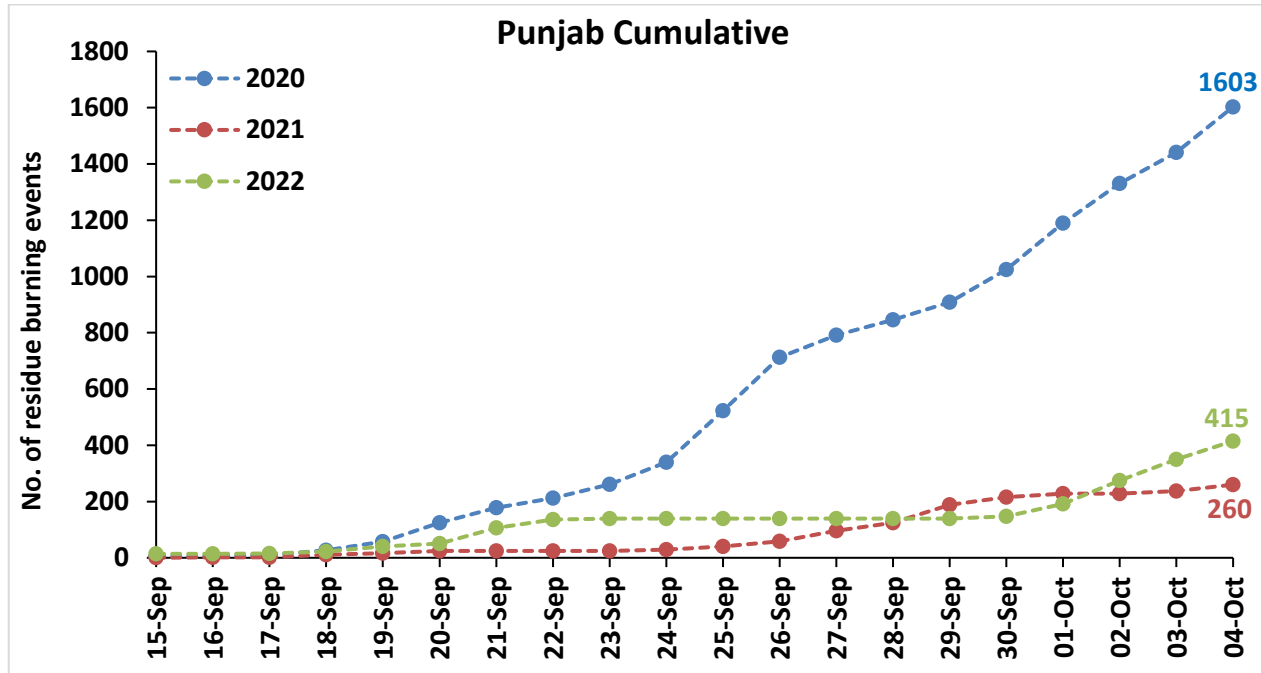
- The active fire events due to rice residue burning were monitored using satellite remote sensing, following the "Standard Protocol for Estimation of Crop Residue Burning Fire Events using Satellite Data".
- Satellites detected **74** residue burning events in the six study States on 04-Oct-2022.
- The state wise events detected on 04-Oct-2022 were **65** in Punjab, **7** in Haryana, **2** in UP, **0** in Delhi, **0** in Rajasthan and **0** in MP.
- Total **533** burning events were detected in the six states between 15-Sept-2022 and 04-Oct-2022, which are distributed as **415**, **24**, **80**, **0**, **7** and **7** in Punjab, Haryana, UP, Delhi, Rajasthan and MP, respectively.
- Detection of residue burning events was hampered by the presence of clouds over eastern Uttar Pradesh and eastern Madhya Pradesh.

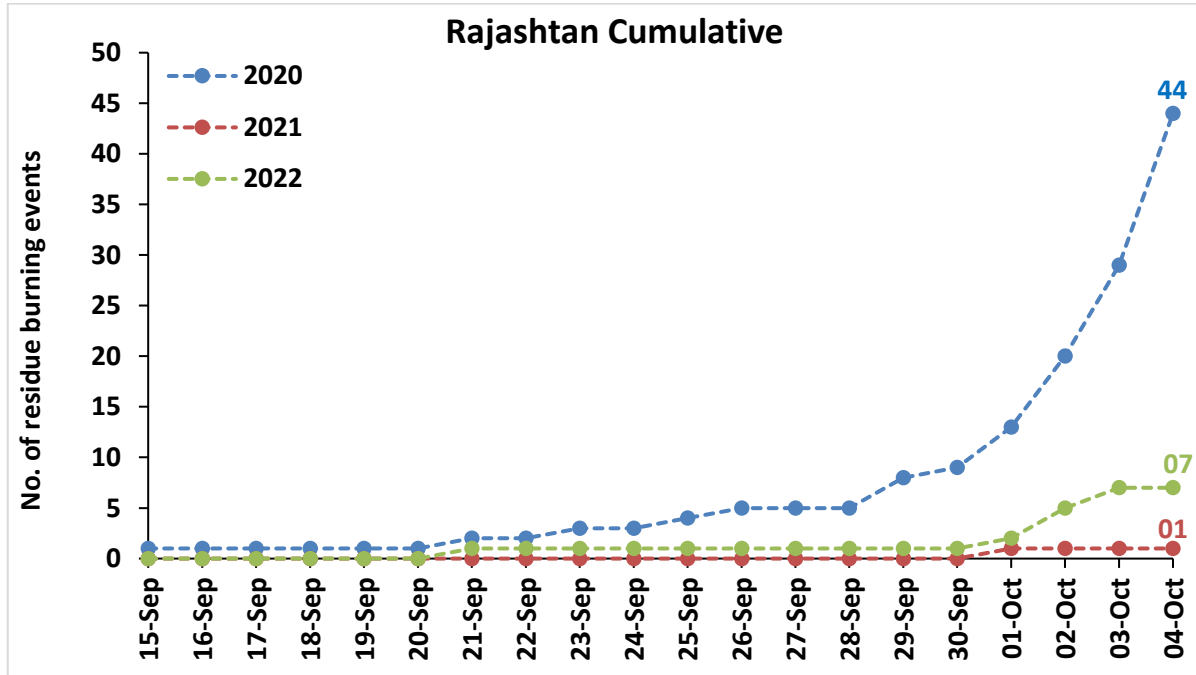
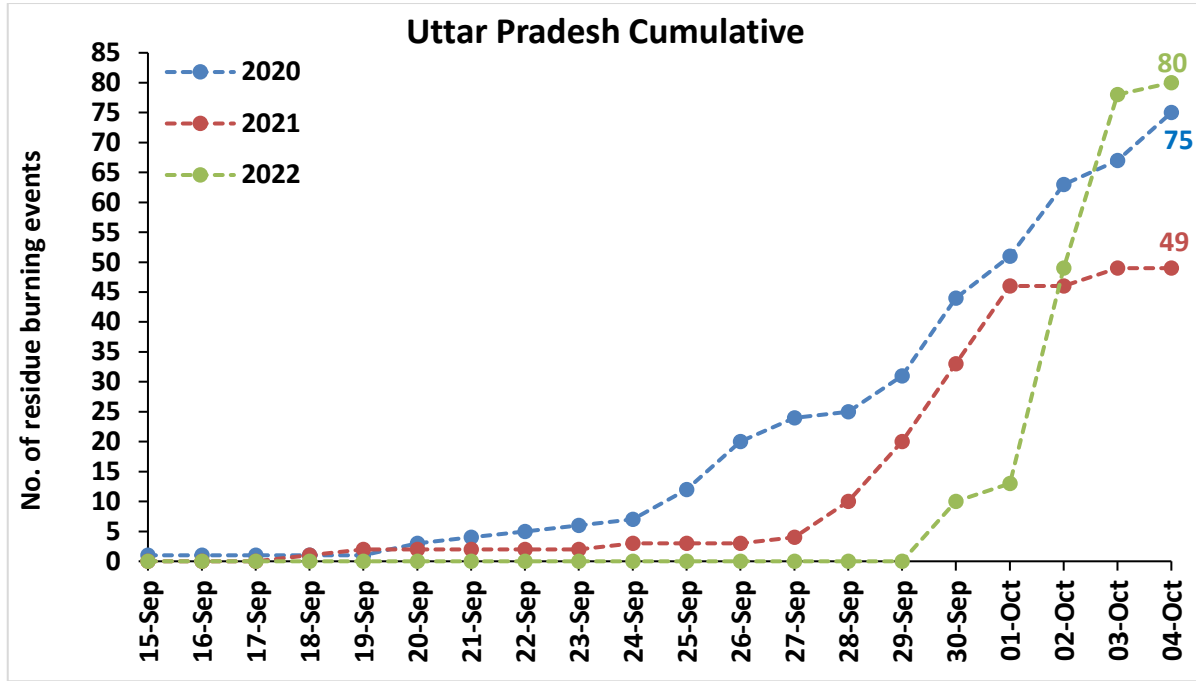
Temporal distribution of rice residue burning events for the study States in 2022

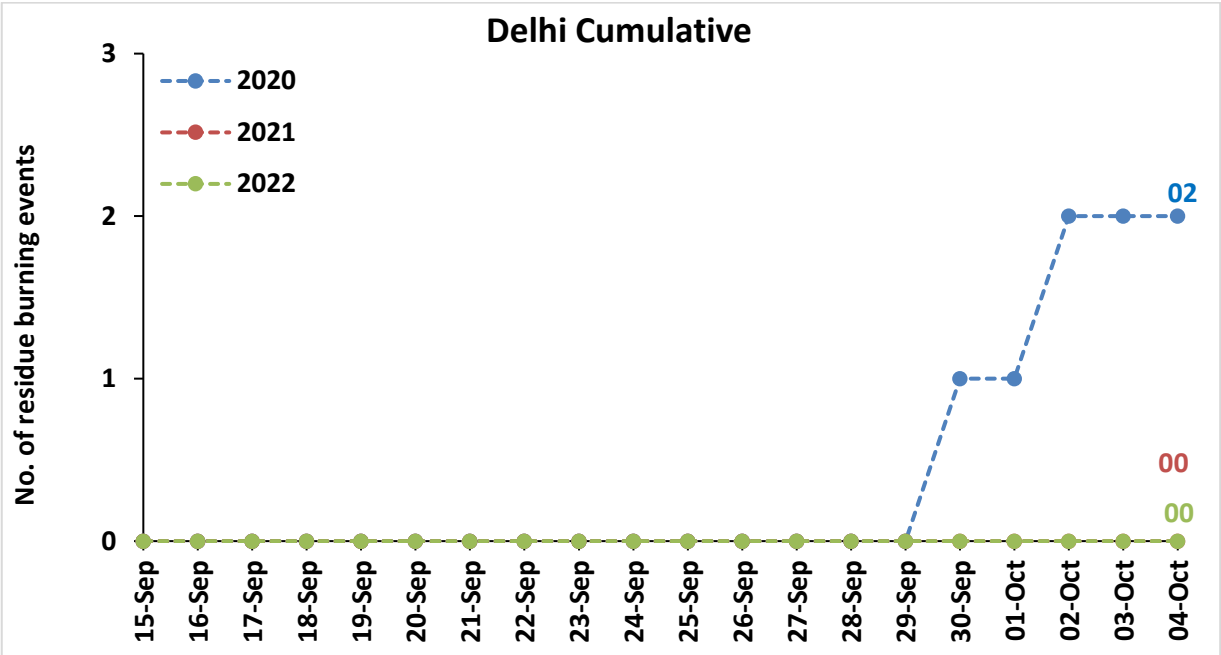
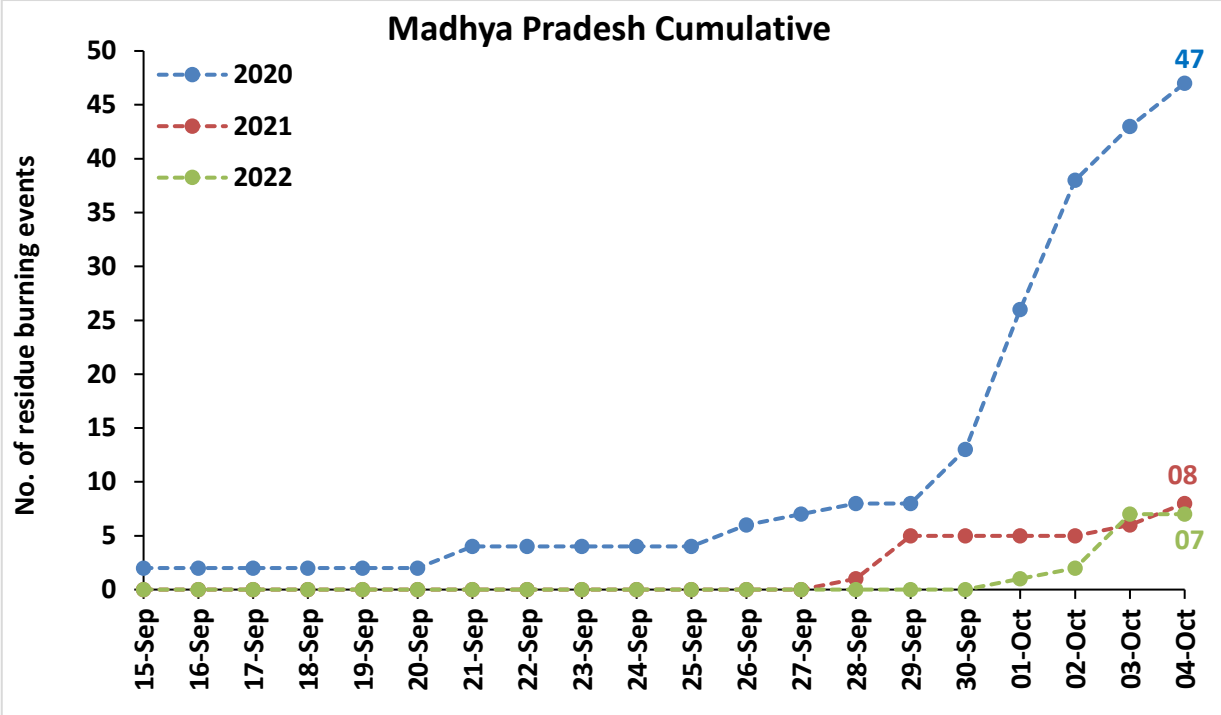




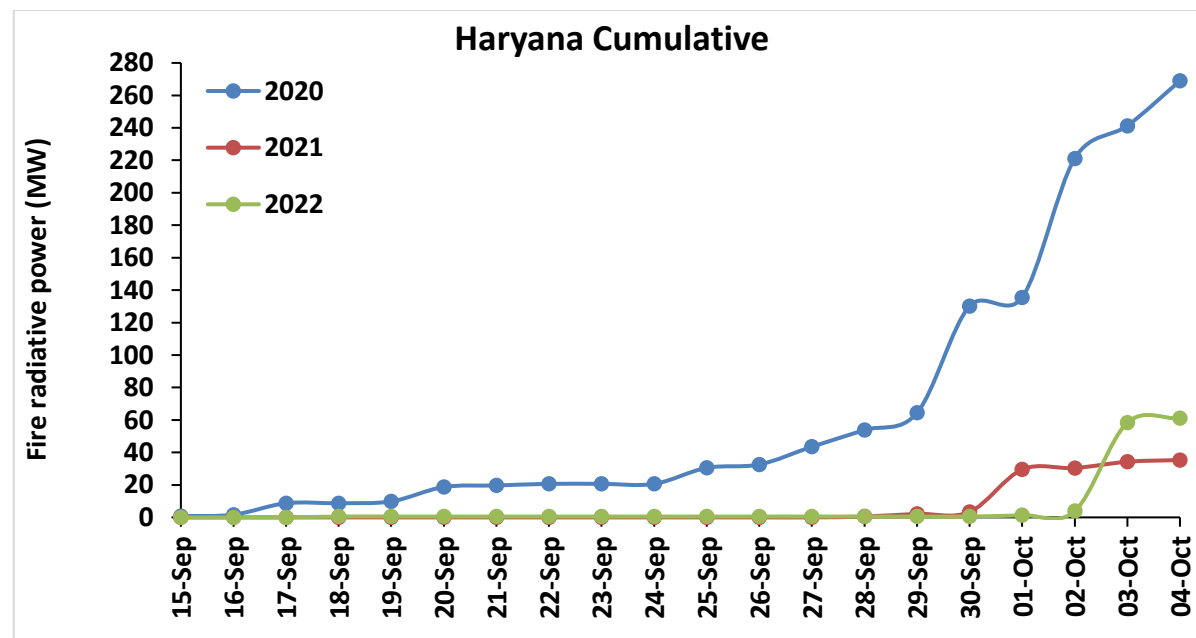
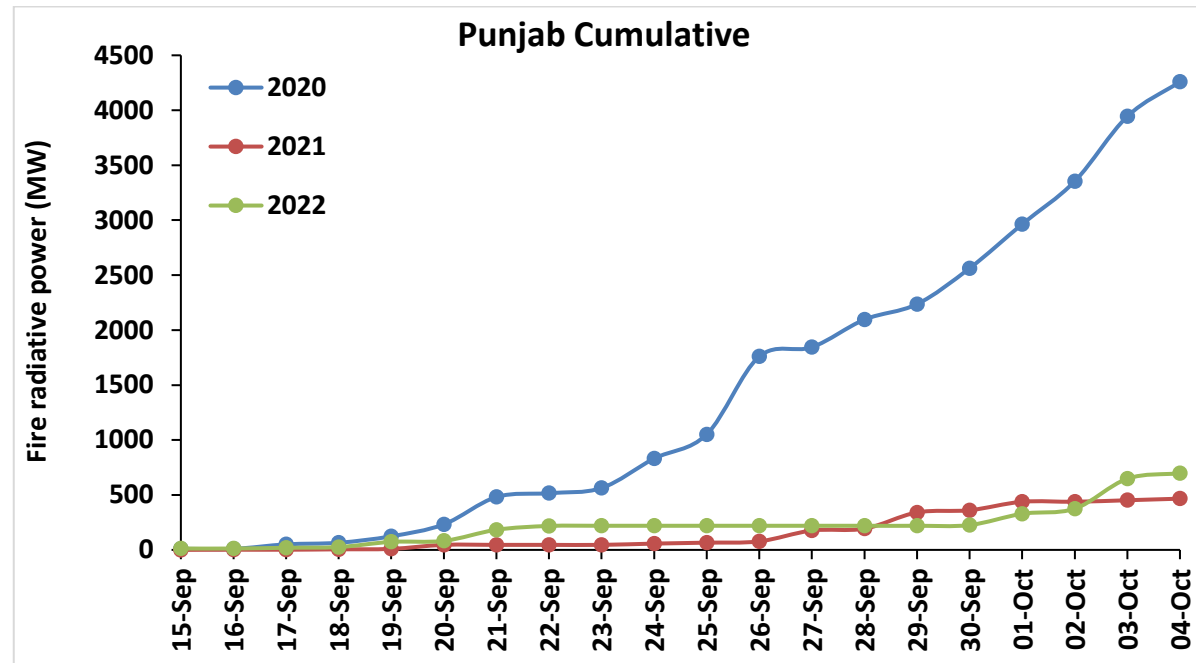
Comparison of residue burning events in current year (2022) with previous years (2020 and 2021) for the study States

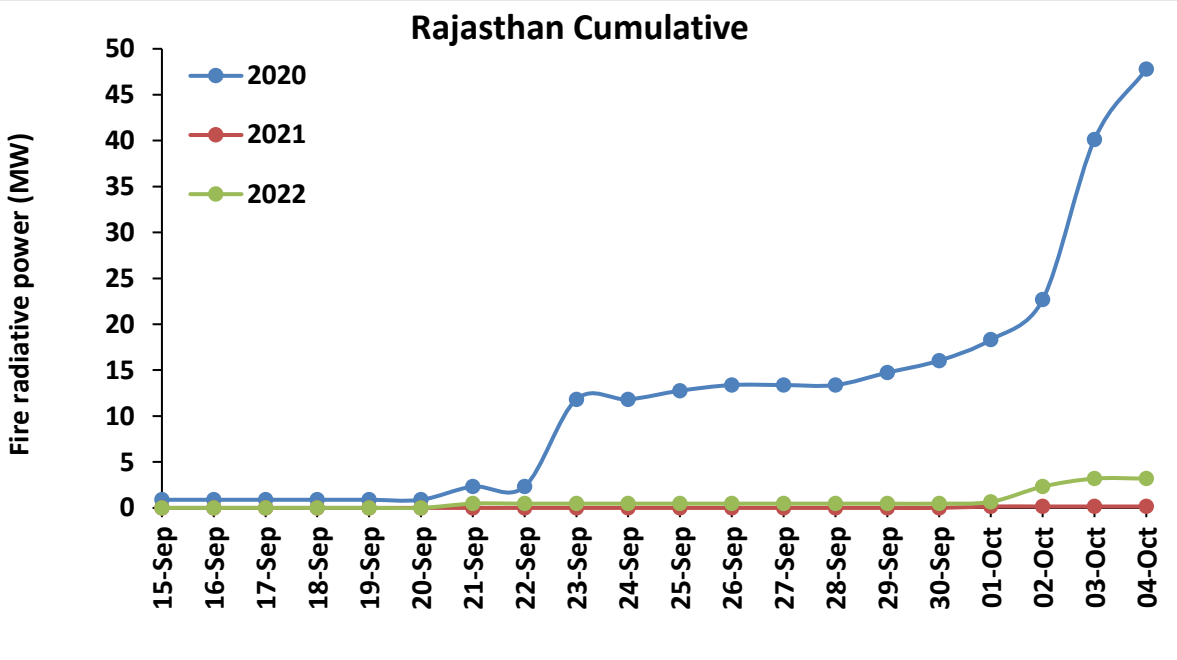
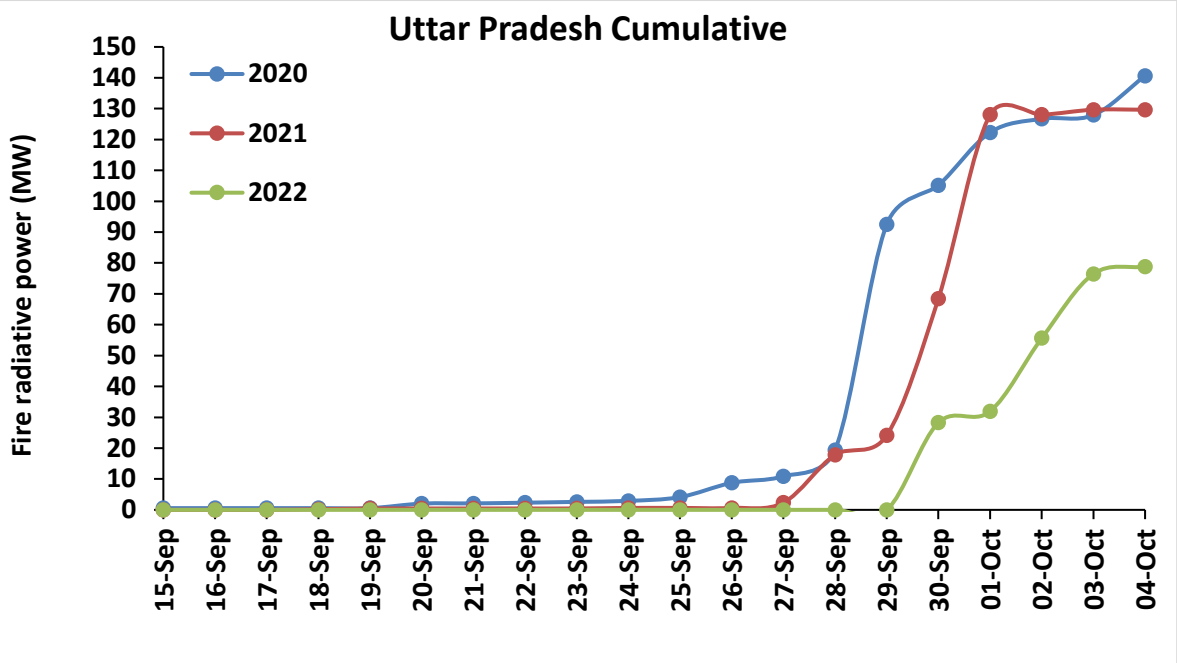


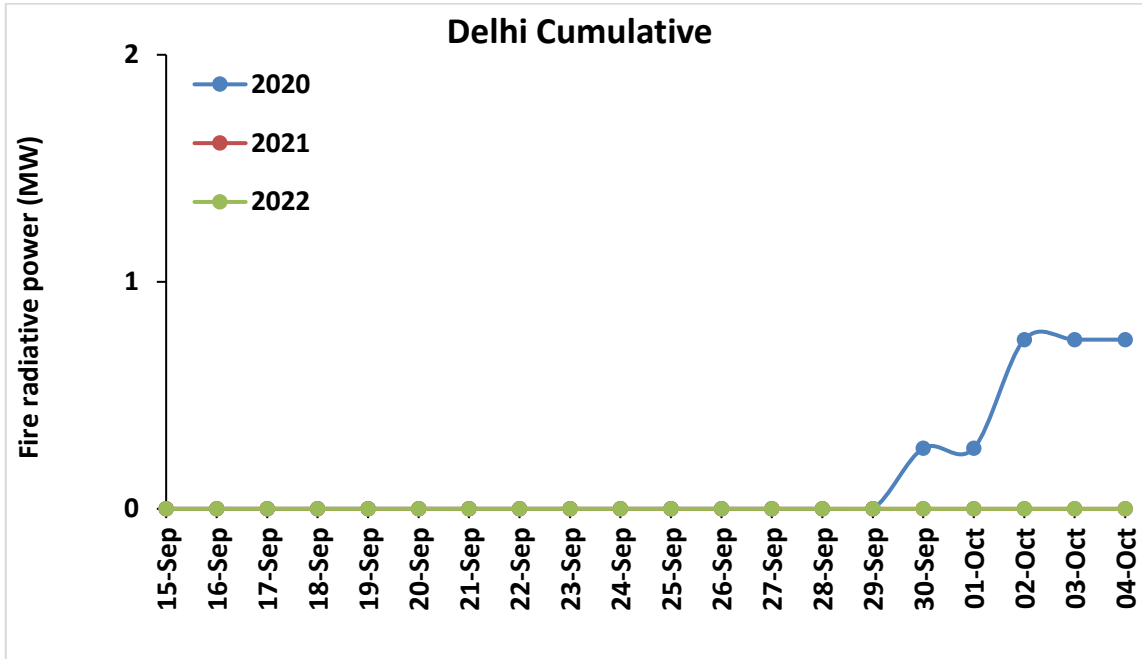
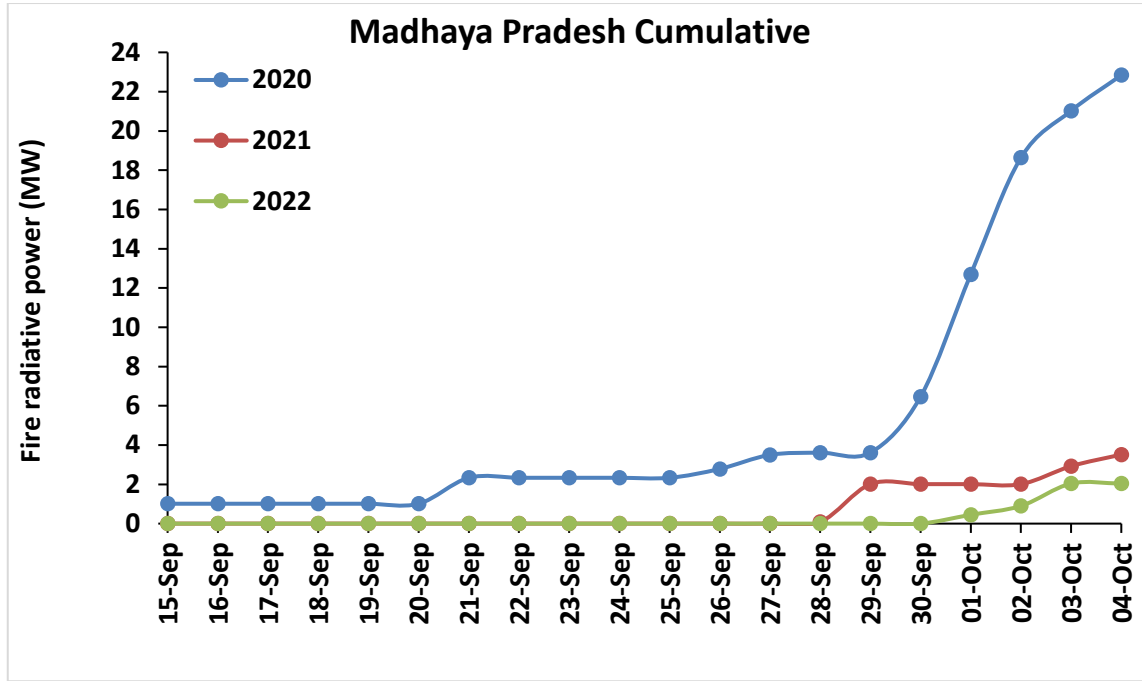




Comparison of residue burning fire power in current year (2022) with previous years (2021 and 2020) for the study States

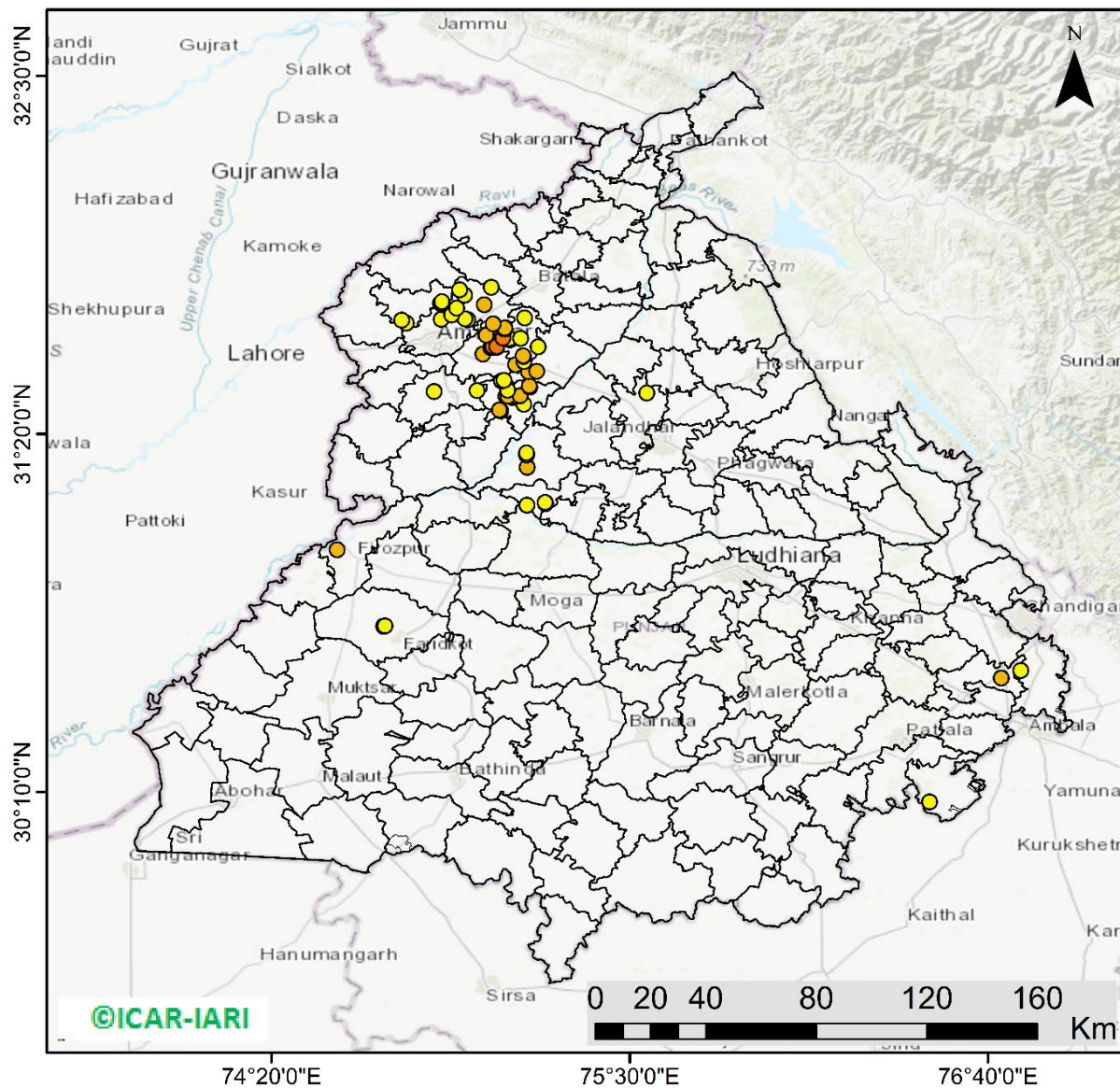






Punjab

RICE RESIDUE BURNING IN PUNJAB



65 burning events detected in Punjab during (04th Oct 2022)

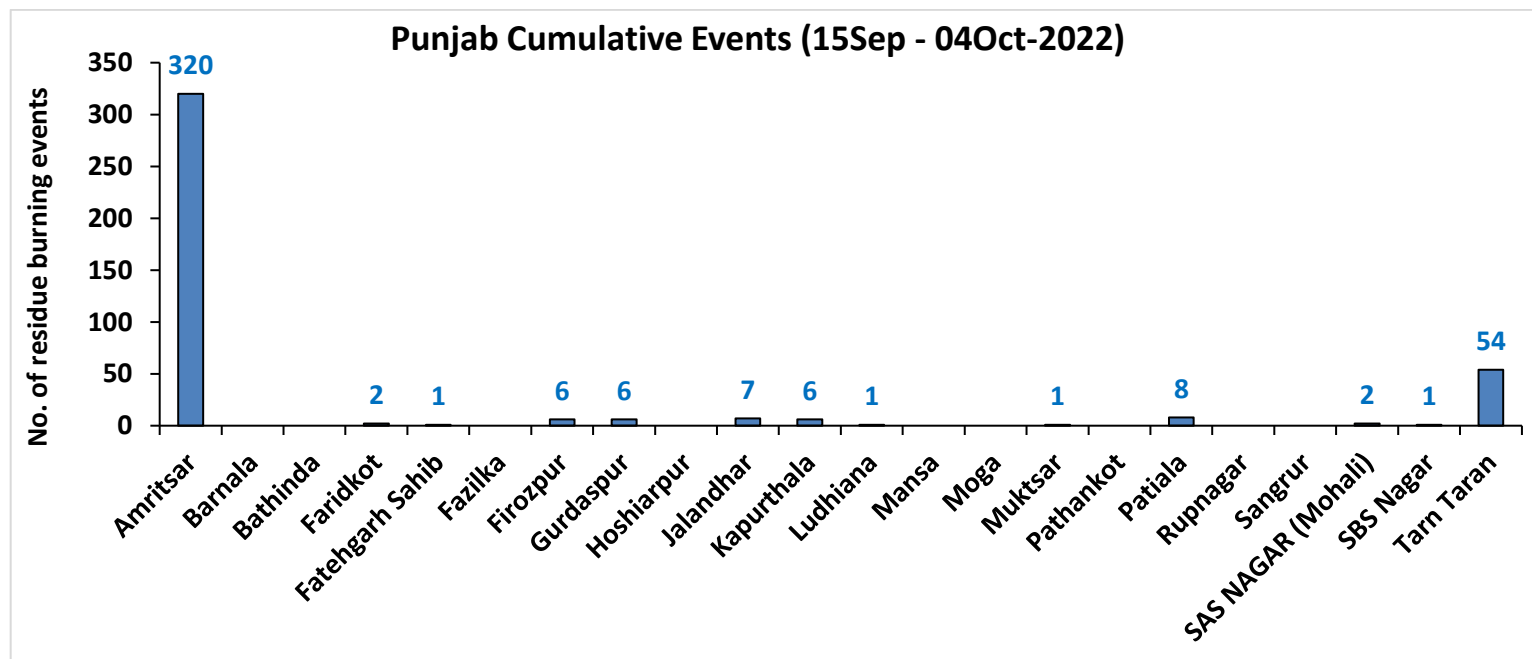
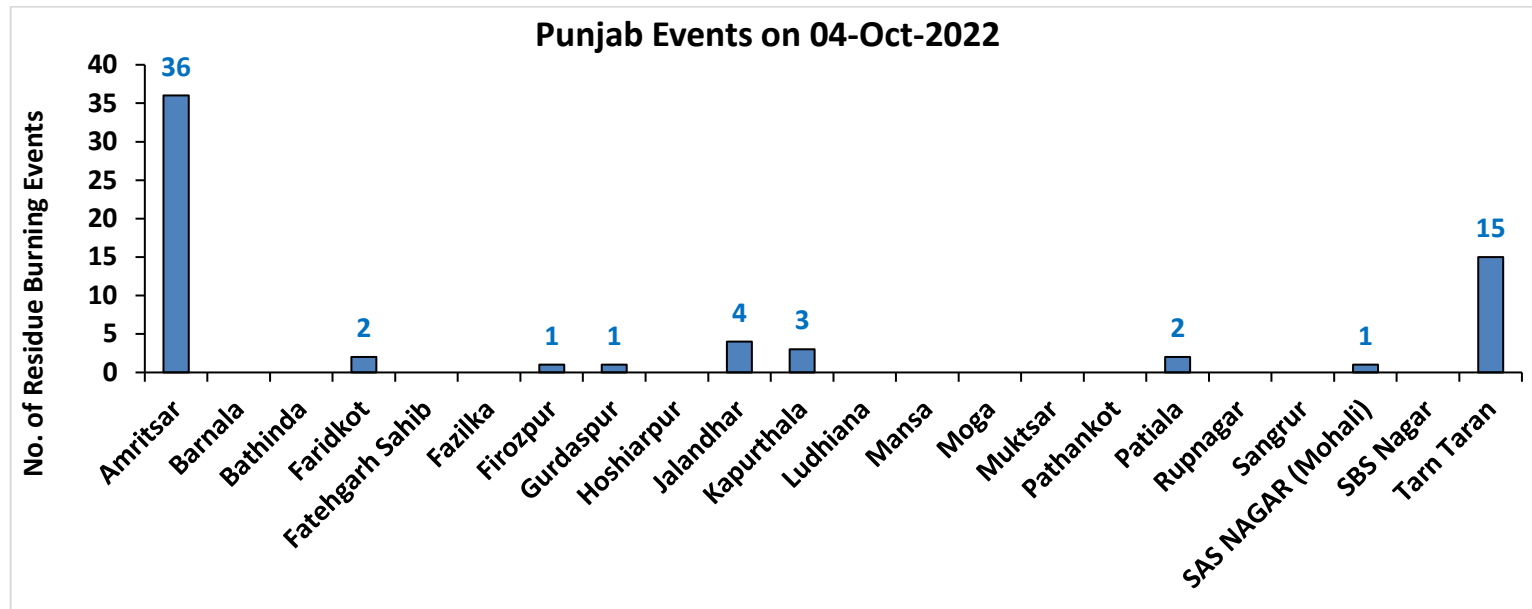
Fire Intensity (W/m²)

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



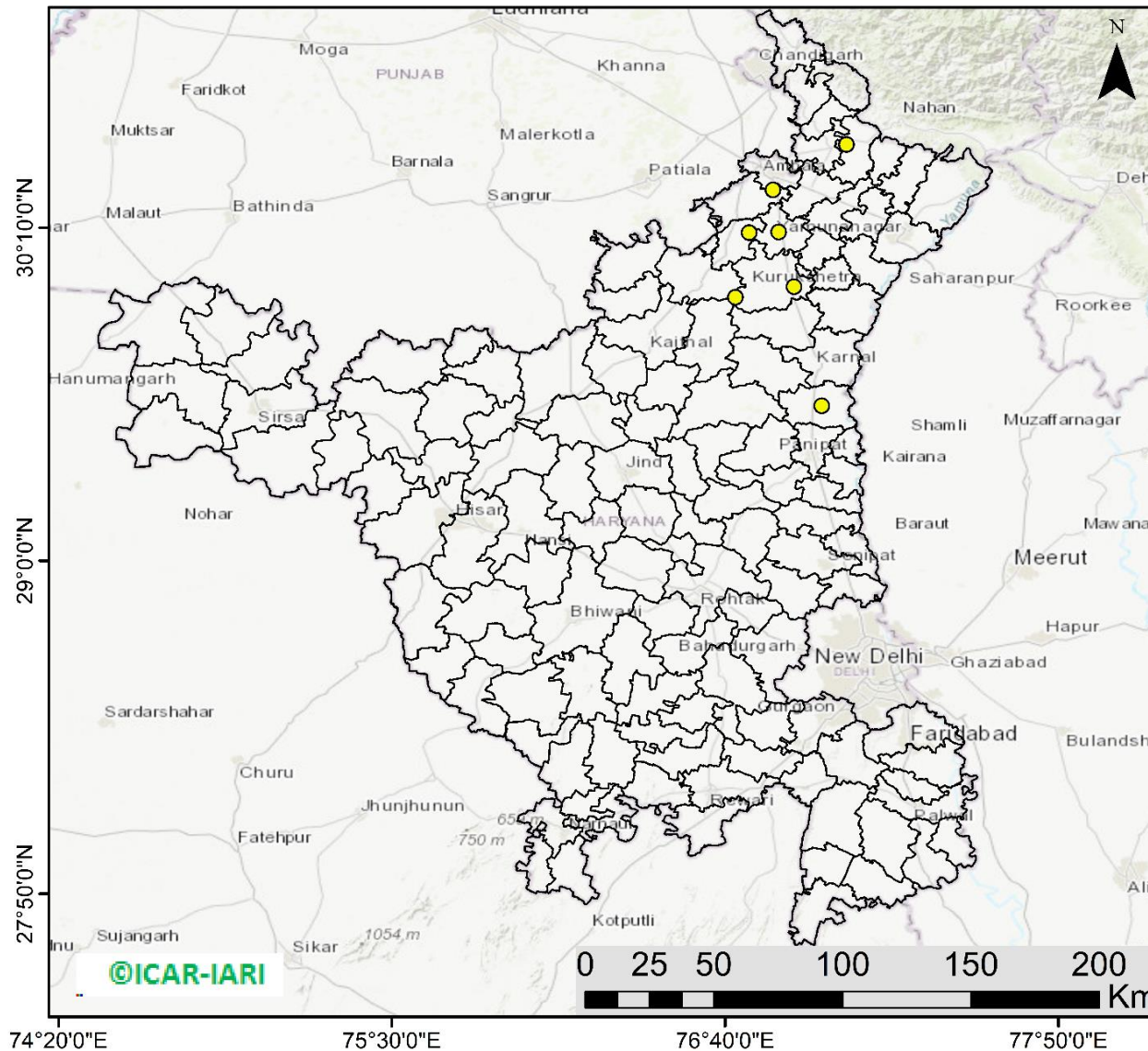
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Punjab (15Sep- 04Oct-2022)



Haryana

RICE RESIDUE BURNING IN HARYANA



07 burning events detected in Haryana on (04th Oct 2022)

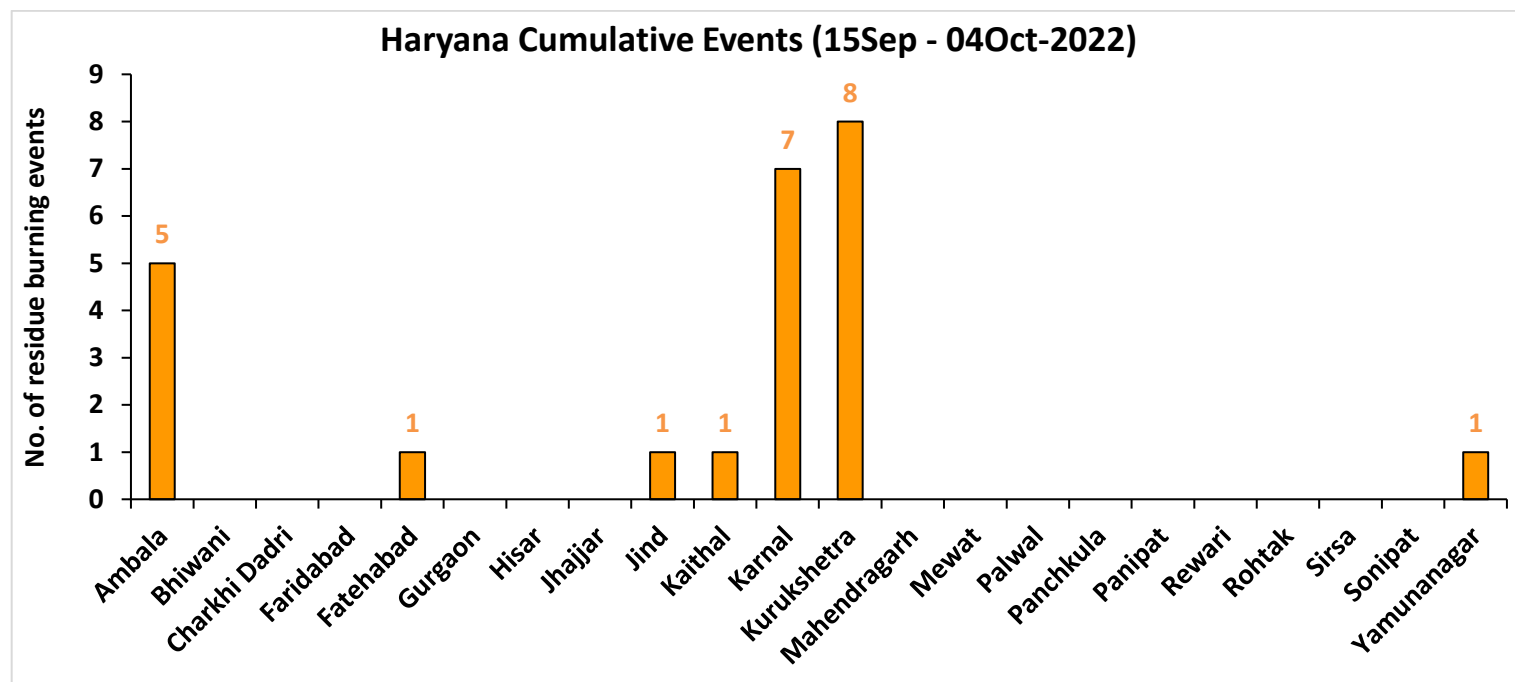
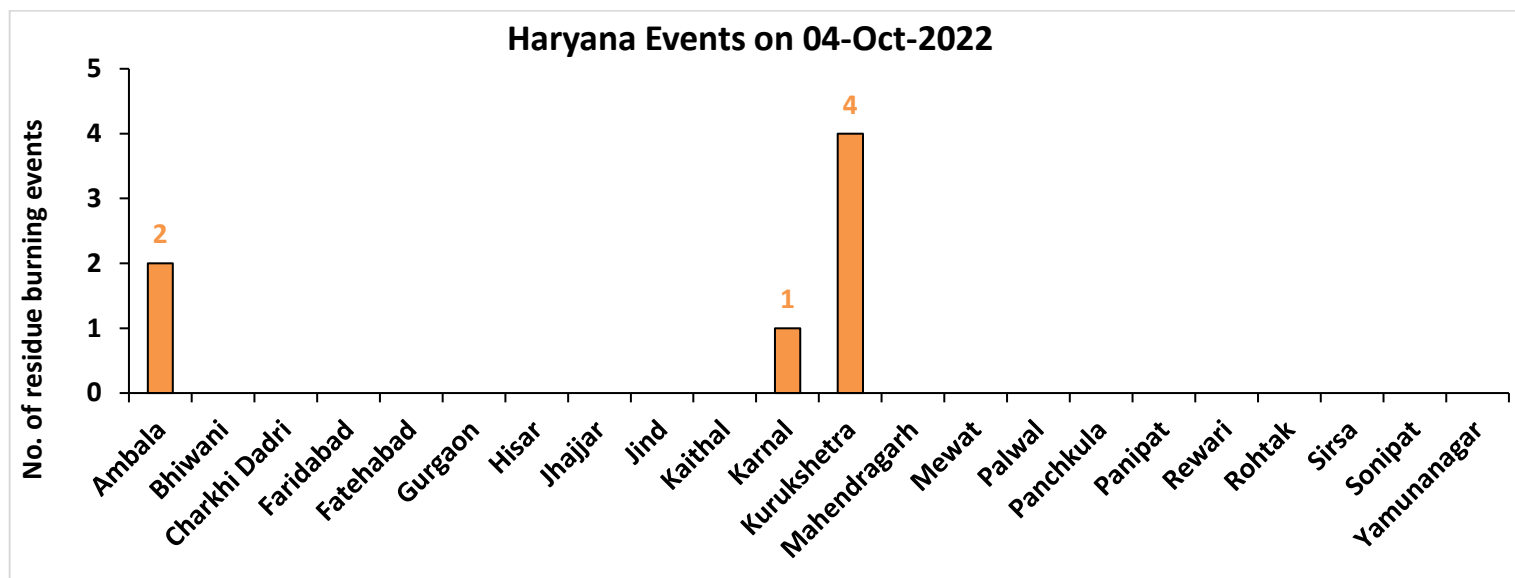
Fire Intensity (W/m²)

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



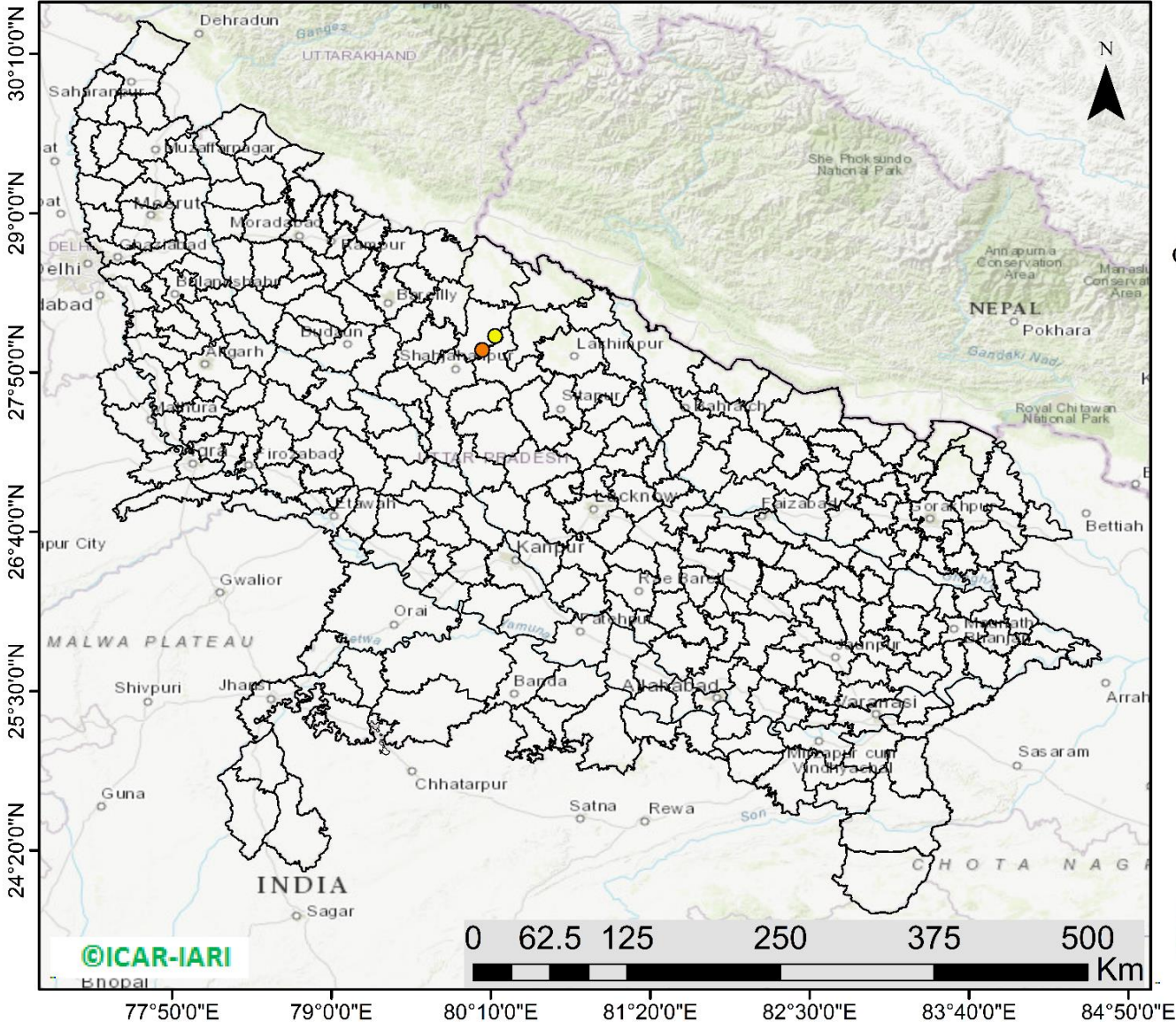
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Haryana (15Sep- 04Oct-2022)



Uttar Pradesh

RICE RESIDUE BURNING IN UTTAR PRADESH



02 burning events detected in Uttar Pradesh on (04th Oct 2022)

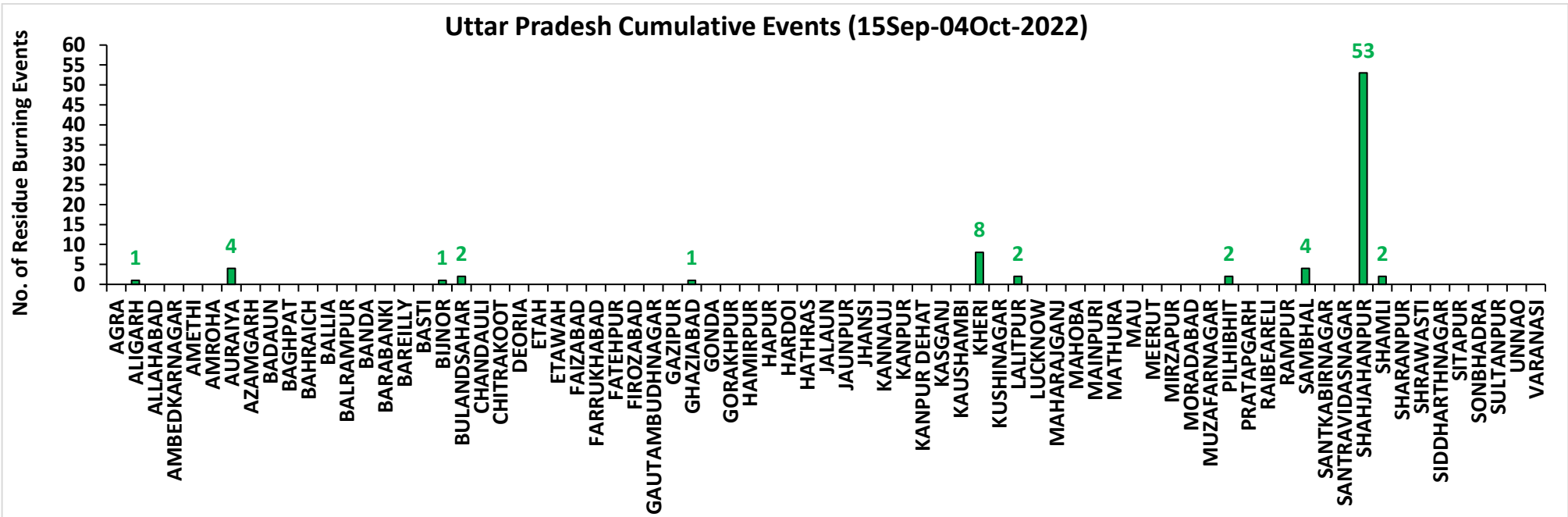
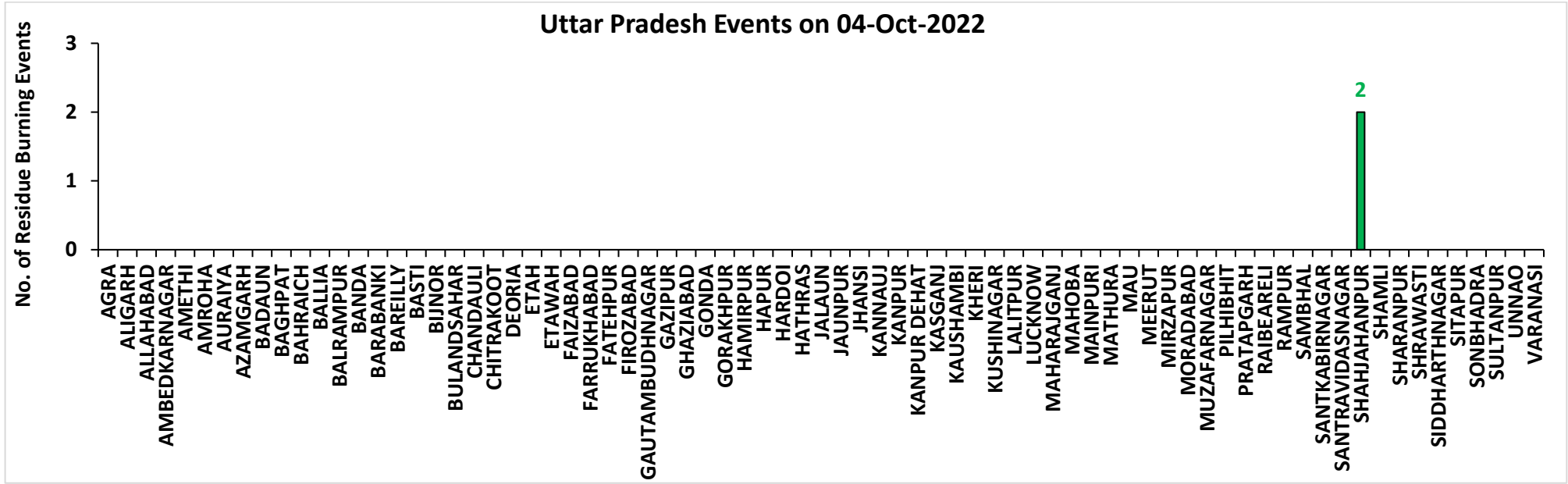
Fire Intensity (W/m2)

- 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 Uttar Pradesh (15Sep- 04Oct-2022)



District-wise cumulative number of residues burning events detected in 2020 ,2021 and 2022
(Period: 15 September-04 October)

(a) Punjab

District	15 Sep-04 Oct 2022		
	2020	2021	2022
Amritsar	1015	161	320
Barnala	2	0	0
Bathinda	0	0	0
Faridkot	3	9	2
Fatehgarh Sahib	15	1	1
Fazilka	0	1	0
Firozpur	22	5	6
Gurdaspur	54	4	6
Hoshiarpur	3	0	0
Jalandhar	13	6	7
Kapurthala	22	2	6
Ludhiana	34	19	1
Mansa	2	0	0
Moga	9	0	0
Muktsar	1	1	1
Pathankot	0	0	0
Patiala	63	11	8
Rupnagar	1	1	0
Sangrur	17	4	0
SAS NAGAR (Mohali)	8	0	2
SBS Nagar	2	1	1
Tarn Taran	317	34	54
Total	1603	260	415

(b) Haryana

District	15 Sep-04 Oct 2022		
	2020	2021	2022
AMBALA	22	0	5
BHIWANI	0	0	0
CHARKHI DADRI	0	0	0
FARIDABAD	0	0	0
FATEHABAD	15	1	1
GURGAON	0	0	0
HISAR	3	0	0
JHAJJAR	0	0	0
JIND	2	0	1
KAITHAL	21	2	1
KARNAL	46	4	7
KURUKSHETRA	31	12	8
MAHENDRAGARH	0	0	0
MEWAT	0	0	0
PALWAL	1	0	0
PANCHKULA	0	0	0
PANIPAT	6	0	0
REWARI	0	0	0
ROHTAK	0	0	0
SIRSA	1	0	0
SONIPAT	2	1	0
YAMUNANAGAR	10	1	1
Total	160	21	24

(c) Uttar Pradesh

District	15 Sep-04 Oct 2022										
	2020	2021	2022	GAUTAMBUDHNAGAR	1	0	0	MUZAFARNAGAR	2	0	0
AGRA	0	0	0	GAZIPUR	0	0	0	PILHIBHIT	3	1	2
ALIGARH	4	0	1	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	2	3	0
AMETHI	0	0	0	HAMIRPUR	0	0	0	SAMBHAL	5	0	4
AMROHA	0	0	0	HAPUR	2	0	0	SANTKABIRNAGAR	0	0	0
AURAIYA	11	0	4	HARDOI	0	0	0	SANTRAVIDASNAGAR	0	0	0
AZAMGARH	0	0	0	HATHRAS	0	0	0	SHAHJAHANPUR	5	37	53
BADAUN	0	0	0	JALAUN	0	0	0	SHAMLI	7	2	2
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	1	0	0	SONBHADRA	0	0	0
BARABANKI	1	0	0	KASGANJ	0	0	0	SULTANPUR	0	0	0
BAREILLY	2	0	0	KAUSHAMBI	1	0	0	UNNAO	2	0	0
BASTI	0	0	0	KHERI	2	3	8	VARANASI	0	0	0
BIJNOR	1	0	1	KUSHINAGAR	0	0	0	Total	75	49	80
BULANDSAHAR	1	0	2	LALITPUR	0	1	2				
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	2	0	0	MAINPURI	0	0	0				
ETAWAH	0	0	0	MATHURA	2	1	0				
FAIZABAD	0	0	0	MAU	0	0	0				
FARRUKHABAD	0	0	0	MEERUT	6	0	0				
FATEHPUR	1	0	0	MIRZAPUR	0	0	0				
FIROZABAD	0	0	0	MORADABAD	1	0	0				

(d) Delhi

District	15 Sep-04 Oct 2022		
	2020	2021	2022
CENTRAL	0	0	0
EAST	0	0	0
NEW DELHI	0	0	0
NORTH	1	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	2	0	0

(e) Rajasthan

District	15 Sep-04 Oct 2022		
	2020	2021	2022
AJMER	0	0	0
ALWAR	1	0	0
BANSWARA	0	0	0
BARAN	20	0	3
BARMER	2	0	0
BHARATPUR	0	0	0
BHILWARA	1	0	0
BIKANER	0	0	0
BUNDI	1	0	2
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	8	0	1
JAIPUR	0	0	0
JAISELMER	1	0	0
JALOR	0	0	0
JHALAWAR	0	0	0
JHUNJHUNUN	1	0	0
JODHPUR	1	0	0
KARAULI	1	0	0
KOTA	4	0	1
NAGAUR	0	0	0
PALI	1	0	0
PRATAPGARH	0	0	0
RAJSMAND	0	0	0
SIKAR	0	0	0
SIROHI	0	0	0
SWAIMADHOPUR	0	0	0
TONK	1	0	0
UDAIPUR	0	0	0
Total	44	1	7

(f) Madhya Pradesh

District	15 Sep-04 Oct 2022						
	2020	2021	2022	PANNA	0	0	0
ALIRAJPUR	0	0	0	RAISEN	0	0	0
ANUPPUR	0	0	0	RAJGARH	1	0	2
ASHOKNAGAR	5	0	0	RATLAM	0	0	0
BALAGHAT	0	0	0	REWA	0	0	0
BARWANI	0	0	0	SAGAR	2	2	1
BETUL	0	0	0	SATNA	1	0	0
BHIND	0	0	0	SEHORE	1	0	1
BHOPAL	1	0	0	SEONI	0	0	0
BURHANPUR	0	0	0	SHAHDOL	0	0	0
CHHATARPUR	1	0	0	SHAJAPUR	2	0	0
CHHINDWARA	0	0	0	SHEOPUR	0	0	0
DAMOH	5	0	0	SHIVPURI	0	0	0
DATIA	1	0	0	SIDHI	0	0	0
DEWAS	0	0	0	SINGRAULI	0	0	0
DHAR	4	0	0	TIKAMGARH	0	0	0
DINDORI	0	0	0	UJJAIN	3	0	0
EAST NIMAR	0	0	0	UMARIA	0	0	0
GUNA	5	1	1	VIDESHA	5	1	1
GWALIOR	3	0	1	WEST NIMAR	0	0	0
HARDA	5	4	0	Total	47	8	7
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 - 04 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
02-Oct	141	0	83	30	2	7	12	0	36	1	0	0	7	0	3	12	0	1
03-Oct	110	9	75	8	6	8	4	3	29	0	0	0	9	0	2	5	1	5
04-Oct	162	23	65	29	2	7	8	0	2	0	0	0	15	0	0	4	2	0
Total	1603	260	415	160	21	24	75	49	80	2	0	0	44	1	7	47	8	7

Details of residue burning events in Punjab on 04-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	AMRITSAR	HARSHA CHHINA	S-NPP	31.69380	74.77270	14:25:45	D	3.70
2	AMRITSAR	HARSHA CHHINA	S-NPP	31.70350	74.75750	12:45:28	D	2.80
3	AMRITSAR	HARSHA CHHINA	S-NPP	31.76380	74.88850	14:25:45	D	3.60
4	AMRITSAR	JANDIALA GURU	S-NPP	31.55850	75.12860	12:45:28	D	5.10
5	AMRITSAR	JANDIALA GURU	S-NPP	31.59310	75.02220	14:25:45	D	5.30
6	AMRITSAR	JANDIALA GURU	S-NPP	31.61400	75.04730	14:25:45	D	6.30
7	AMRITSAR	JANDIALA GURU	S-NPP	31.61420	75.05380	14:25:45	D	6.30
8	AMRITSAR	JANDIALA GURU	S-NPP	31.61480	75.06700	14:25:45	D	14.70
9	AMRITSAR	JANDIALA GURU	S-NPP	31.61710	75.05410	14:25:45	D	14.80
10	AMRITSAR	JANDIALA GURU	S-NPP	31.61770	75.06720	14:25:45	D	11.90
11	AMRITSAR	MAJITHA	S-NPP	31.67550	75.09030	14:25:45	D	7.10
12	AMRITSAR	MAJITHA	S-NPP	31.69160	75.05530	14:25:45	D	6.00
13	AMRITSAR	MAJITHA	S-NPP	31.72060	74.92050	12:45:28	D	1.70
14	AMRITSAR	MAJITHA	S-NPP	31.74280	74.93630	12:45:28	D	3.00
15	AMRITSAR	MAJITHA	S-NPP	31.75410	75.02670	12:45:28	D	6.40
16	AMRITSAR	MAJITHA	S-NPP	31.75830	74.88360	12:45:28	D	3.30
17	AMRITSAR	MAJITHA	S-NPP	31.75930	74.88760	12:45:28	D	5.00
18	AMRITSAR	MAJITHA	S-NPP	31.78460	74.96250	14:25:45	D	3.40
19	AMRITSAR	MAJITHA	S-NPP	31.80260	74.94640	12:45:28	D	2.00
20	AMRITSAR	RAYYA	S-NPP	31.53580	75.17050	14:25:45	D	7.90
21	AMRITSAR	RAYYA	S-NPP	31.53690	75.19720	14:25:45	D	5.70
22	AMRITSAR	TARSIKKA	S-NPP	31.56850	75.15560	14:25:45	D	3.20
23	AMRITSAR	TARSIKKA	S-NPP	31.58560	75.15390	12:45:28	D	5.60
24	AMRITSAR	TARSIKKA	S-NPP	31.58740	75.15280	12:45:28	D	6.30
25	AMRITSAR	TARSIKKA	S-NPP	31.61660	75.20190	12:45:28	D	2.00
26	AMRITSAR	TARSIKKA	S-NPP	31.63940	75.11030	12:45:28	D	2.40
27	AMRITSAR	TARSIKKA	S-NPP	31.64460	75.10850	12:45:28	D	3.70
28	AMRITSAR	TARSIKKA	S-NPP	31.64460	75.14490	14:25:45	D	3.20
29	AMRITSAR	TARSIKKA	S-NPP	31.64510	75.08720	12:45:28	D	10.90
30	AMRITSAR	TARSIKKA	S-NPP	31.65460	75.03290	12:45:28	D	5.40
31	AMRITSAR	TARSIKKA	S-NPP	31.67520	75.09400	12:45:28	D	7.00

32	AMRITSAR	TARSIKKA	S-NPP	31.67770	75.09310	12:45:28	D	7.00
33	AMRITSAR	TARSIKKA	S-NPP	31.71080	75.15790	12:45:28	D	4.10
34	AMRITSAR	VERKA	S-NPP	31.70500	74.97320	12:45:28	D	3.40
35	AMRITSAR	VERKA	S-NPP	31.70640	74.88620	12:45:28	D	3.40
36	AMRITSAR	VERKA	S-NPP	31.70830	74.96350	12:45:28	D	4.60
37	FARIDKOT	FARIDKOT	S-NPP	30.70660	74.69860	12:45:28	D	3.90
38	FARIDKOT	FARIDKOT	S-NPP	30.70770	74.70290	12:45:28	D	5.00
39	FIROZPUR	FIROZPUR	S-NPP	30.95570	74.54720	14:25:45	D	6.30
40	GURDASPUR	FATEHGARH CHURIAN	S-NPP	31.81070	75.04910	14:25:45	D	3.50
41	JALANDHAR	JALANDHAR WEST	S-NPP	31.46610	75.55560	12:45:28	D	2.30
42	JALANDHAR	LOHIAN	S-NPP	31.10090	75.16560	14:25:45	D	3.90
43	JALANDHAR	LOHIAN	S-NPP	31.10570	75.22620	14:25:45	D	9.10
44	JALANDHAR	LOHIAN	S-NPP	31.11000	75.22450	14:25:45	D	4.90
45	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.22450	75.16640	14:25:45	D	9.40
46	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.26430	75.16430	14:25:45	D	3.80
47	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.27100	75.16400	14:25:45	D	3.80
48	PATIALA	BHUNARHERI	S-NPP	30.13450	76.47700	12:45:28	D	2.10
49	PATIALA	RAJPURA	S-NPP	30.53810	76.71000	14:25:45	D	5.70
50	SAS NAGAR (MOHALI)	DERABASSI	S-NPP	30.56230	76.77400	12:45:28	D	2.10
51	TARN TARAN	KHADUR SAHIB	S-NPP	31.40830	75.07980	14:25:45	D	7.00
52	TARN TARAN	KHADUR SAHIB	S-NPP	31.41090	75.07590	14:25:45	D	6.00
53	TARN TARAN	KHADUR SAHIB	S-NPP	31.42980	75.15510	12:45:28	D	2.20
54	TARN TARAN	KHADUR SAHIB	S-NPP	31.45140	75.11780	12:45:28	D	8.70
55	TARN TARAN	KHADUR SAHIB	S-NPP	31.45470	75.11700	12:45:28	D	9.60
56	TARN TARAN	KHADUR SAHIB	S-NPP	31.45550	75.09700	14:25:45	D	8.30
57	TARN TARAN	KHADUR SAHIB	S-NPP	31.45580	75.10350	14:25:45	D	8.30
58	TARN TARAN	KHADUR SAHIB	S-NPP	31.45750	75.14300	14:25:45	D	7.70
59	TARN TARAN	KHADUR SAHIB	S-NPP	31.47560	75.10250	14:25:45	D	3.50
60	TARN TARAN	KHADUR SAHIB	S-NPP	31.48550	75.17480	14:25:45	D	10.80
61	TARN TARAN	KHADUR SAHIB	S-NPP	31.48930	75.17300	14:25:45	D	6.60
62	TARN TARAN	KHADUR SAHIB	S-NPP	31.50560	75.08280	12:45:28	D	3.10
63	TARN TARAN	KHADUR SAHIB	S-NPP	31.50750	75.09070	12:45:28	D	2.20
64	TARN TARAN	TARN TARAN	S-NPP	31.47120	74.86320	14:25:45	D	4.80
65	TARN TARAN	TARN TARAN	S-NPP	31.47440	75.00310	12:45:28	D	2.40

Details of residue burning events in Haryana on 04-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	AMBALA	AMBALA-II	S-NPP	30.29880	76.83440	12:45:28	D	4.30
2	AMBALA	NARAINGARH	S-NPP	30.45770	77.09180	12:45:28	D	3.60
3	KARNAL	GHARAUNDA	S-NPP	29.54280	77.00530	12:45:28	D	2.10
4	KURUKSHETRA	ISMAILABAD	S-NPP	30.14880	76.75140	12:45:28	D	2.90
5	KURUKSHETRA	SHAHBAD	S-NPP	30.15150	76.85430	12:45:28	D	3.40
6	KURUKSHETRA	THANESAR	S-NPP	29.92300	76.70290	12:45:28	D	1.50
7	KURUKSHETRA	THANESAR	S-NPP	29.96000	76.90810	12:45:28	D	1.80

Details of residue burning events in Uttar Pradesh on 04-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	SHAHJAHANPUR	PUWANYA	S-NPP	27.99700	80.10490	12:45:28	D	14.20
2	SHAHJAHANPUR	PUWANYA	S-NPP	28.09870	80.19860	12:45:28	D	2.60

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>)
