



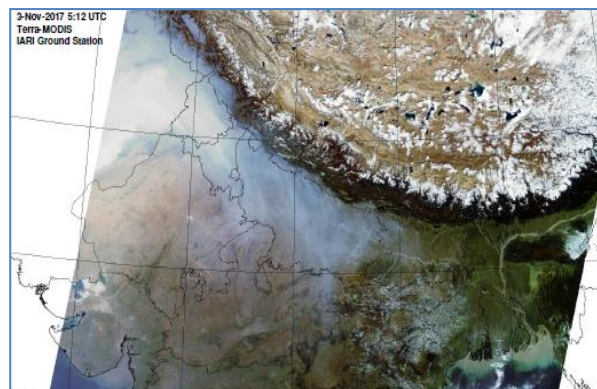
Bulletin No. 23

Events Date:
07-Oct-2022

Issued on:
07-Oct-2022



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



Prepared by:

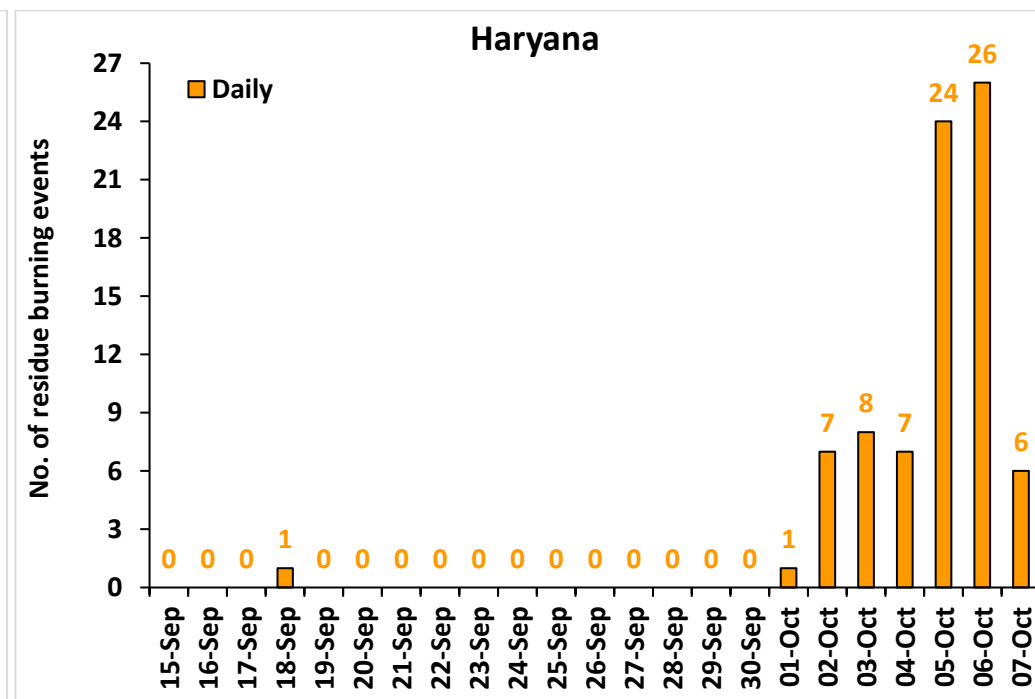
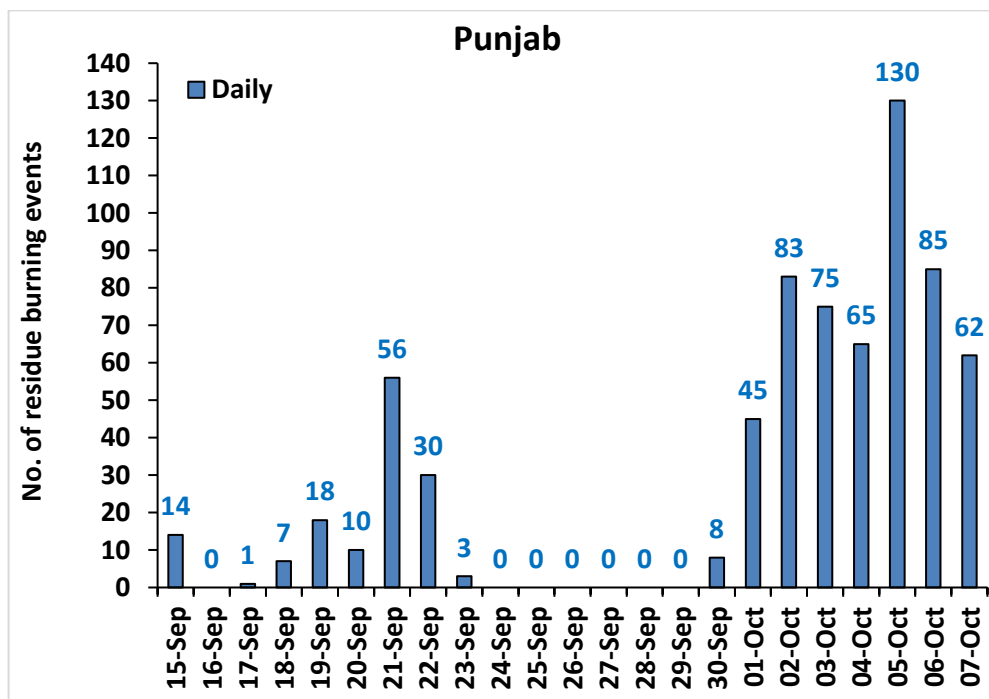
Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012

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

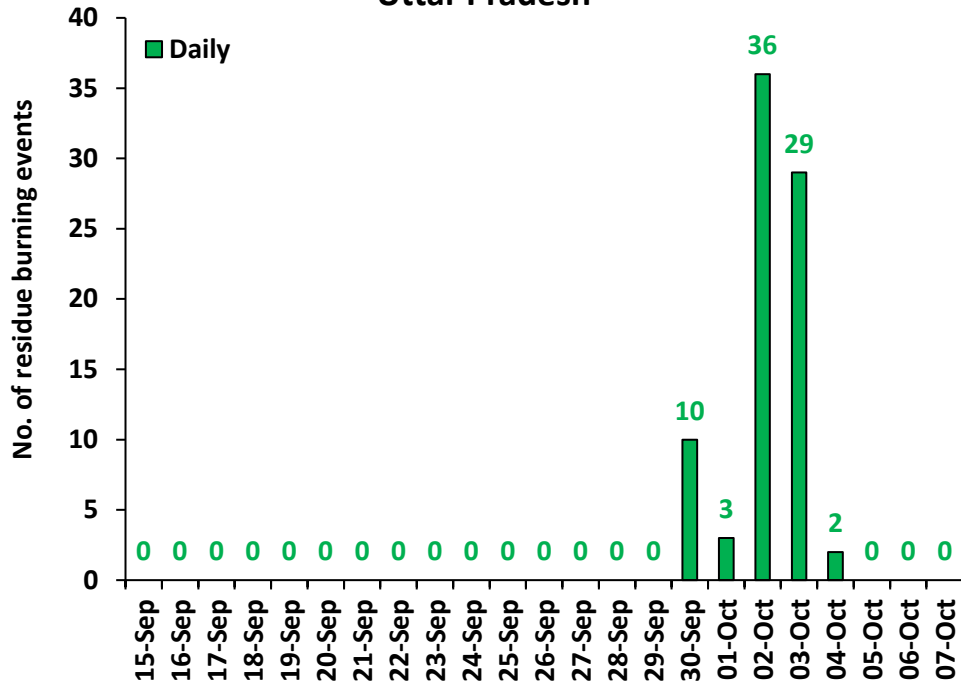
Highlights for 07-Oct-2022

- 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 **69** residue burning events in the six study States on 07-Oct-2022.
- The state wise events detected on 07-Oct-2022 were **62** in Punjab, **6** in Haryana, **0** in UP, **0** in Delhi, **1** in Rajasthan and **0** in MP.
- Total **870** burning events were detected in the six states between 15-Sept-2022 and 07-Oct-2022, which are distributed as **692**, **80**, **80**, **2**, **9** and **7** in Punjab, Haryana, UP, Delhi, Rajasthan and MP, respectively.
- Detection of residue burning events was hampered by the presence of clouds over Haryana, Delhi, Uttar Pradesh and Madhya Pradesh.

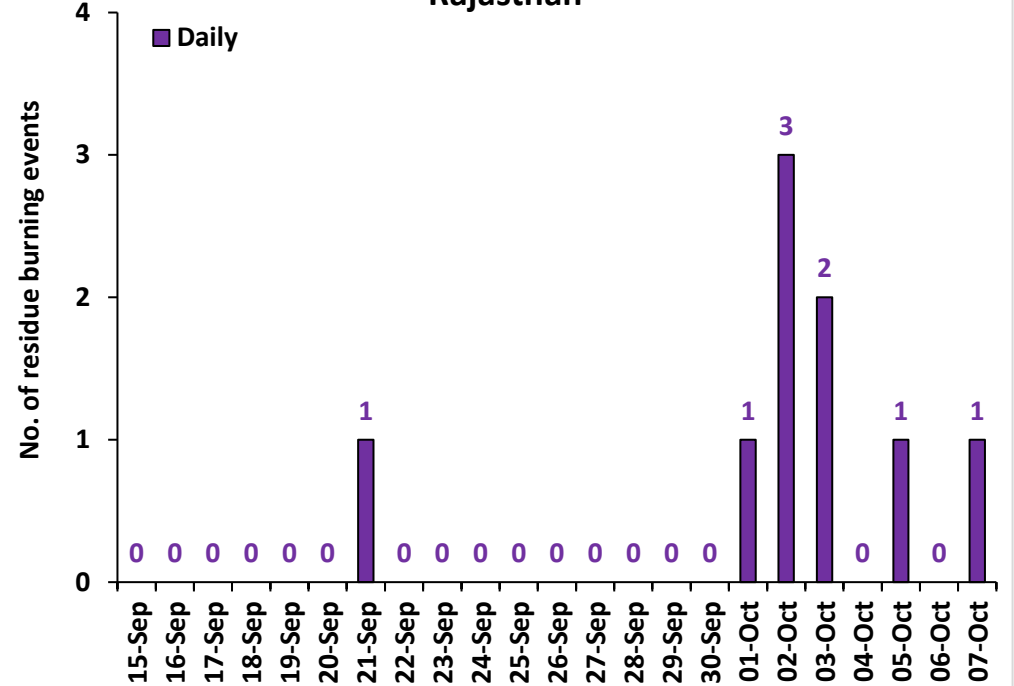
Temporal distribution of rice residue burning events for the study States in 2022



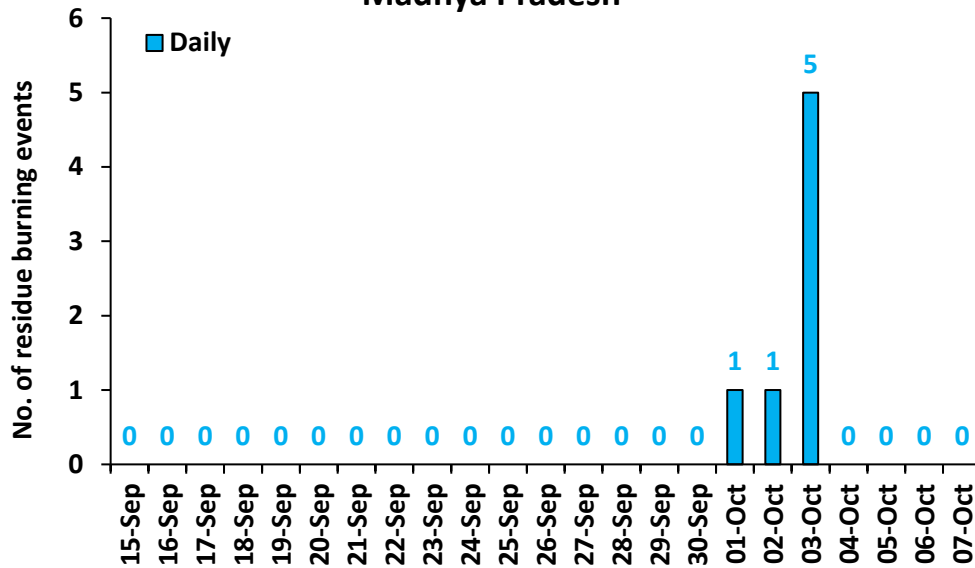
Uttar Pradesh



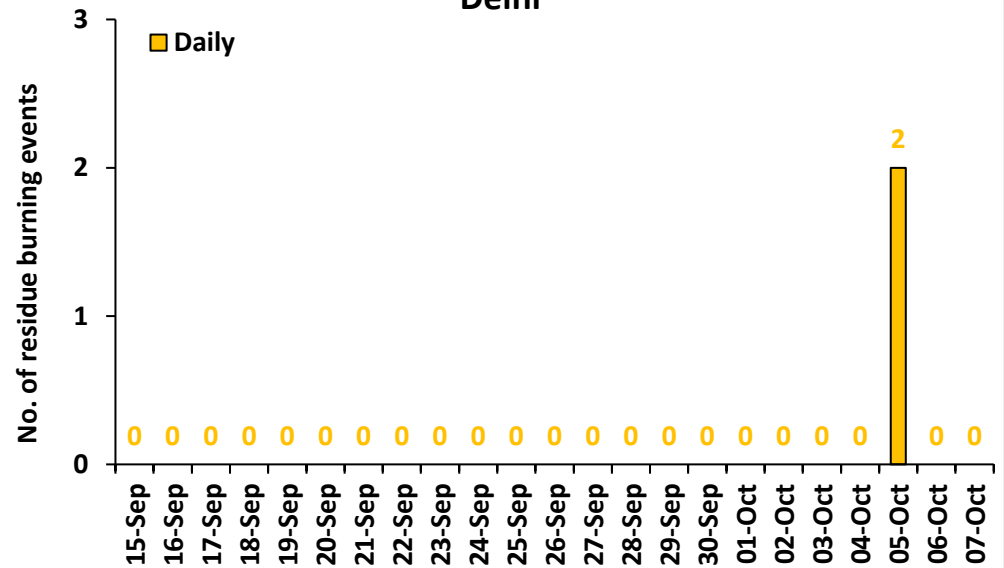
Rajasthan



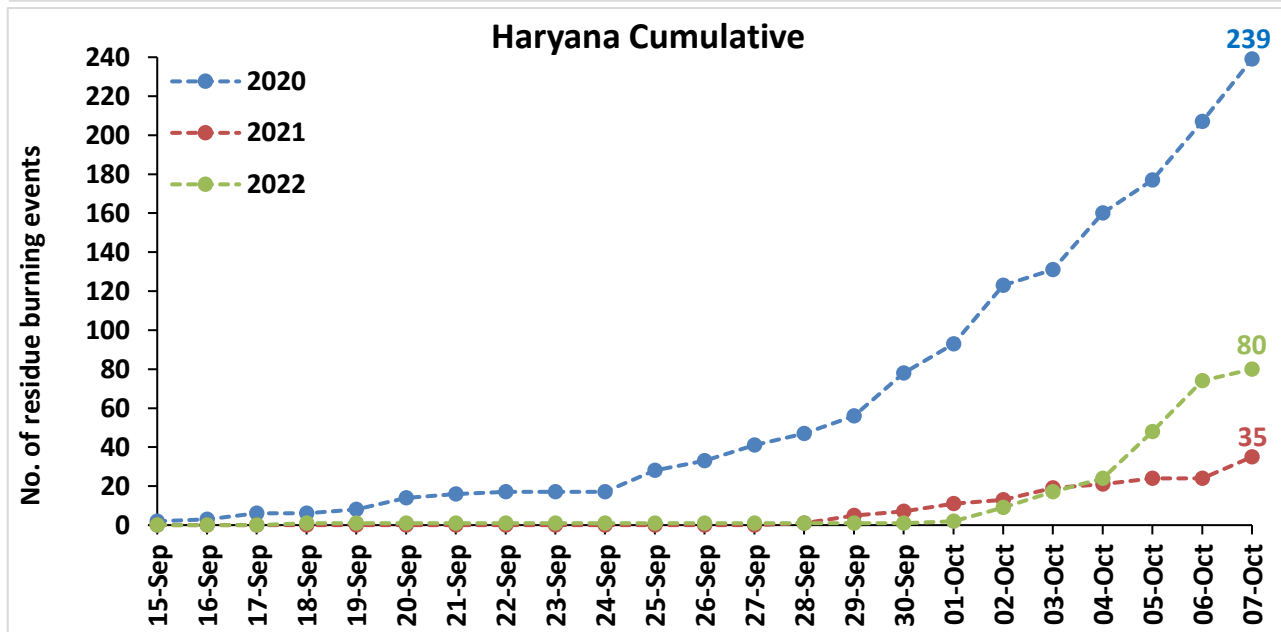
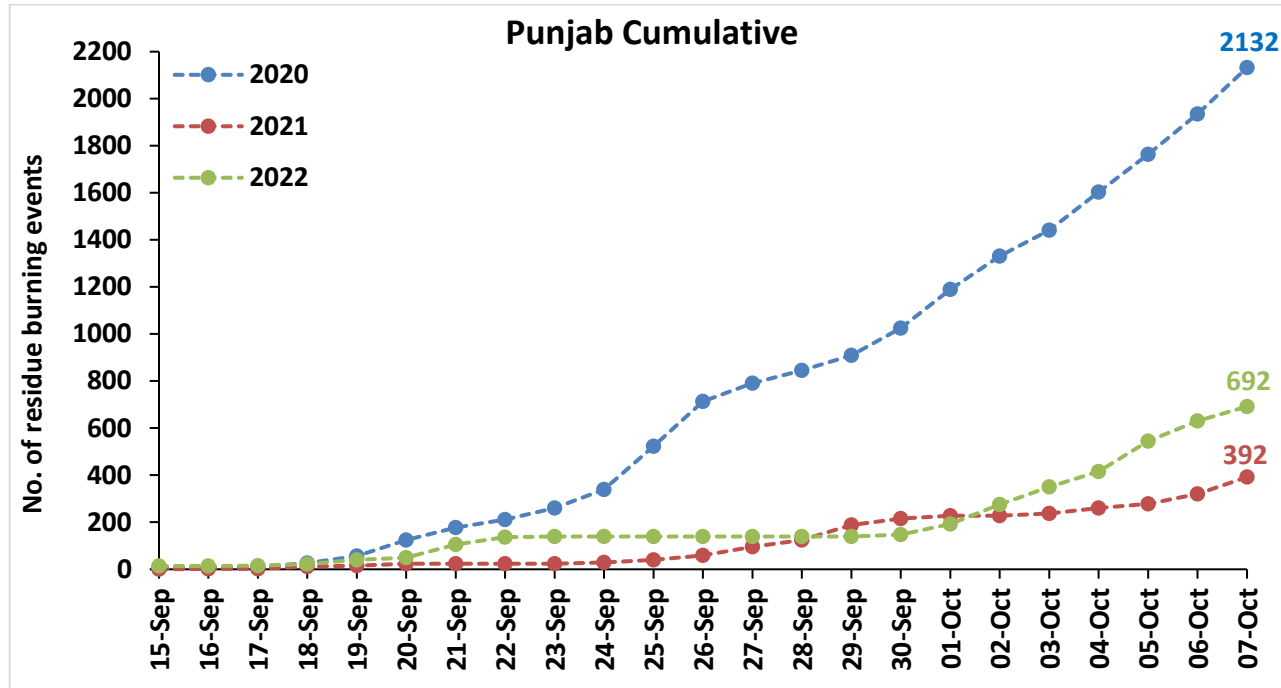
Madhya Pradesh

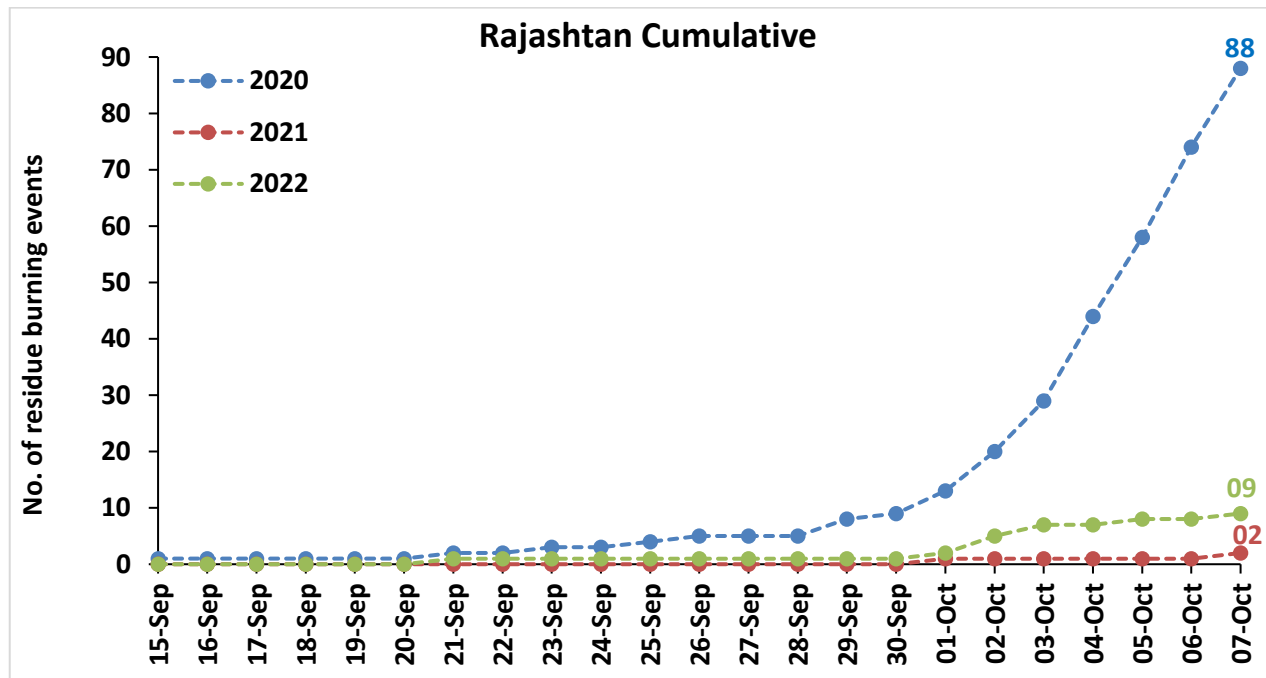
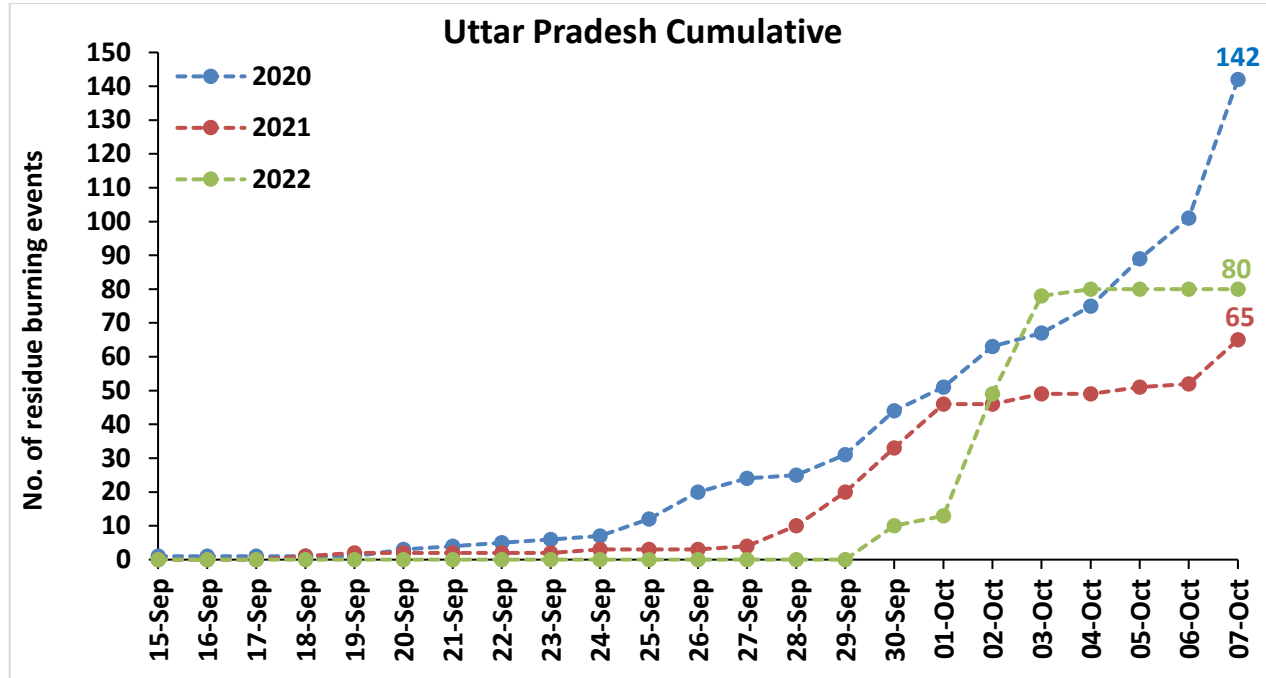


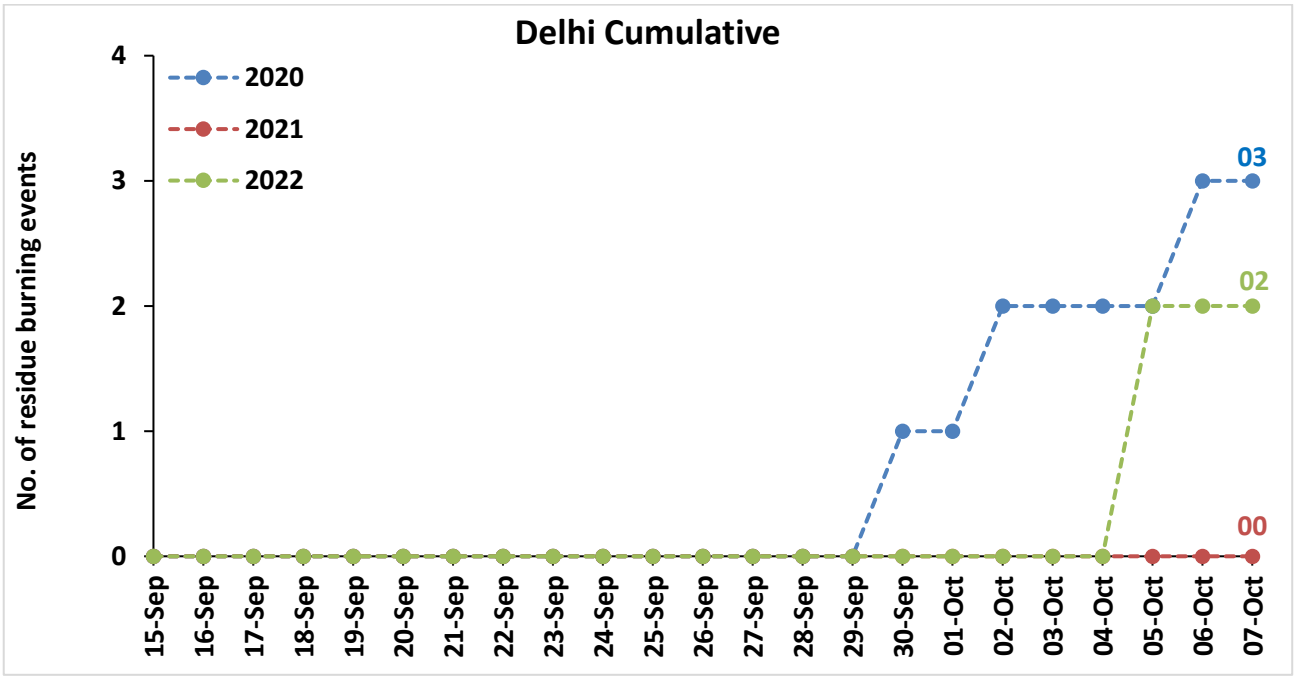
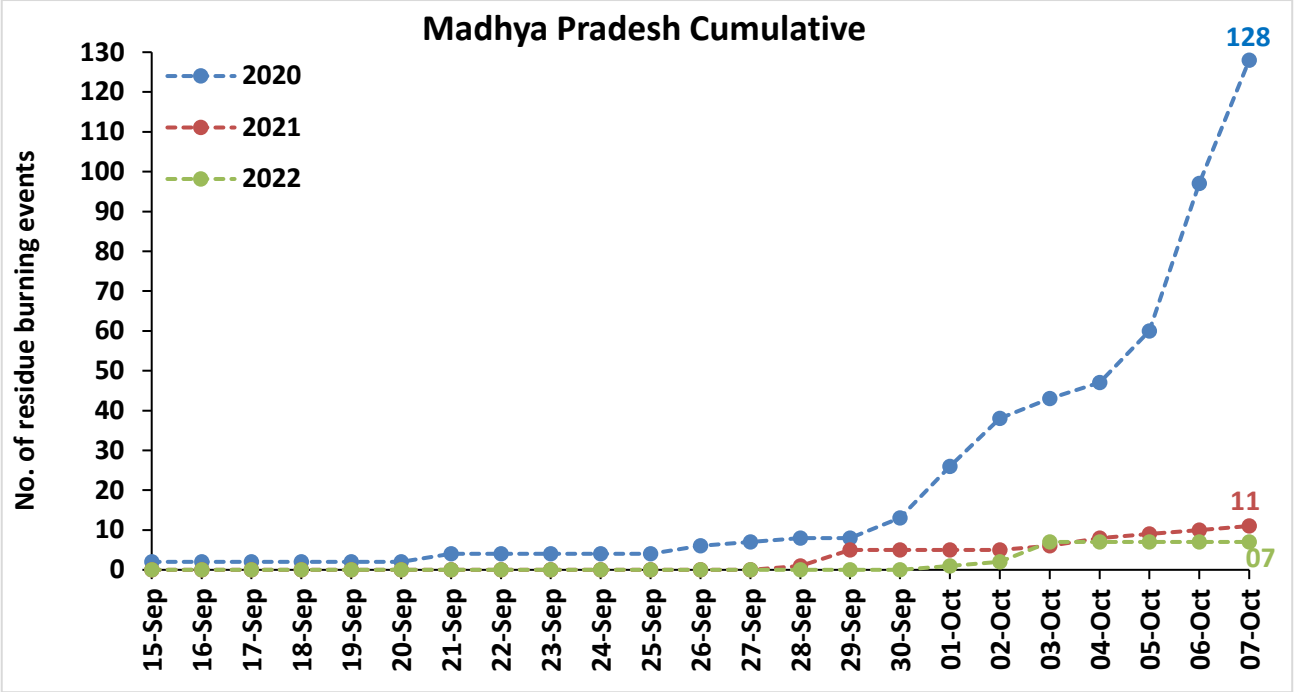
Delhi



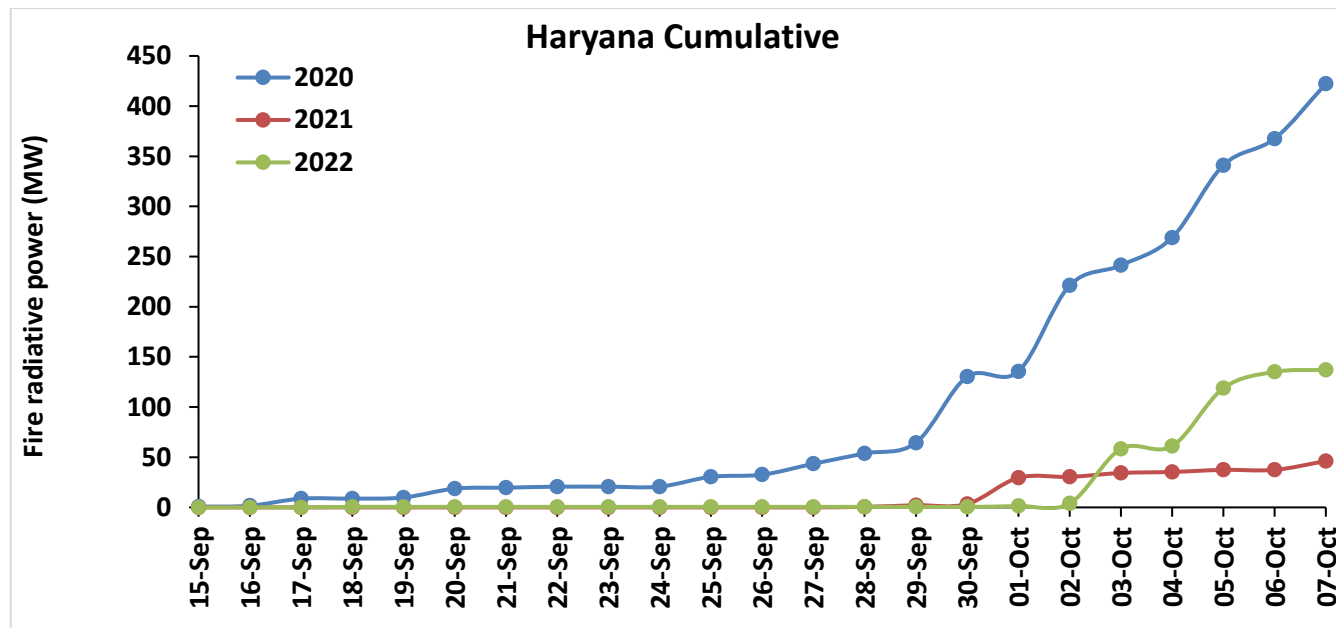
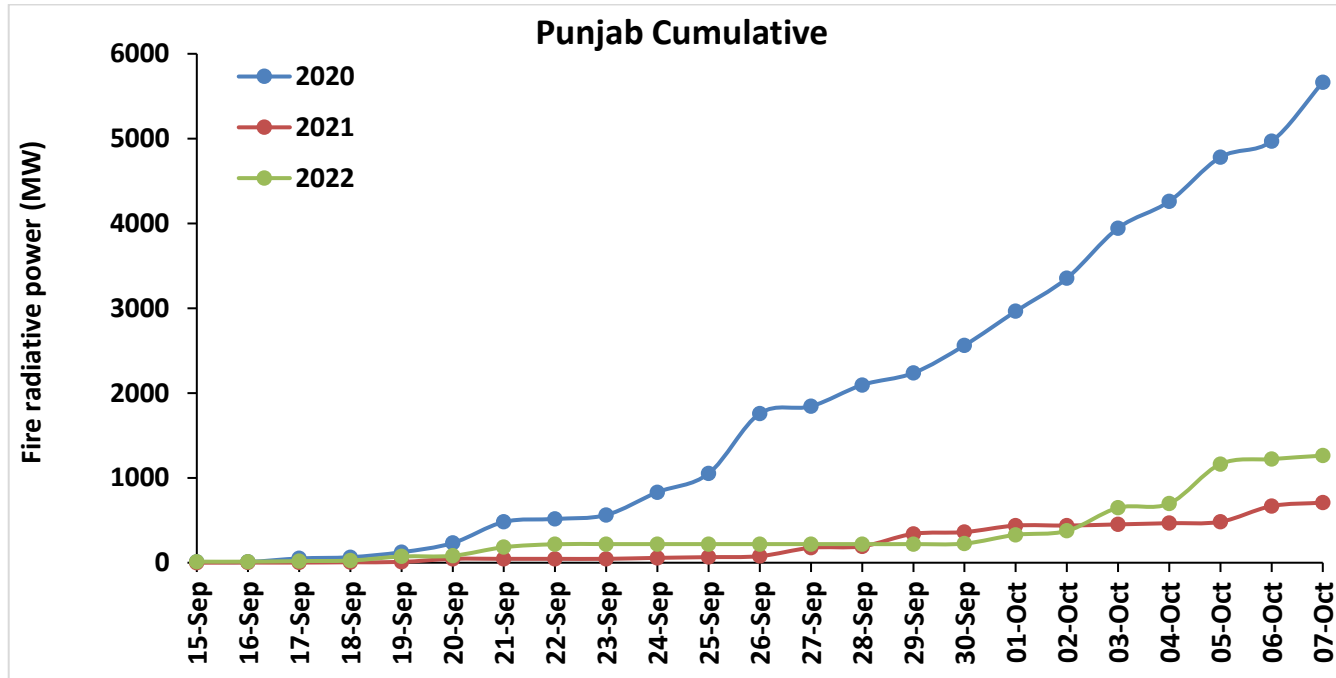
Comparison of residue burning events in current year (2022) with previous years (2020 and 2021) for the study States

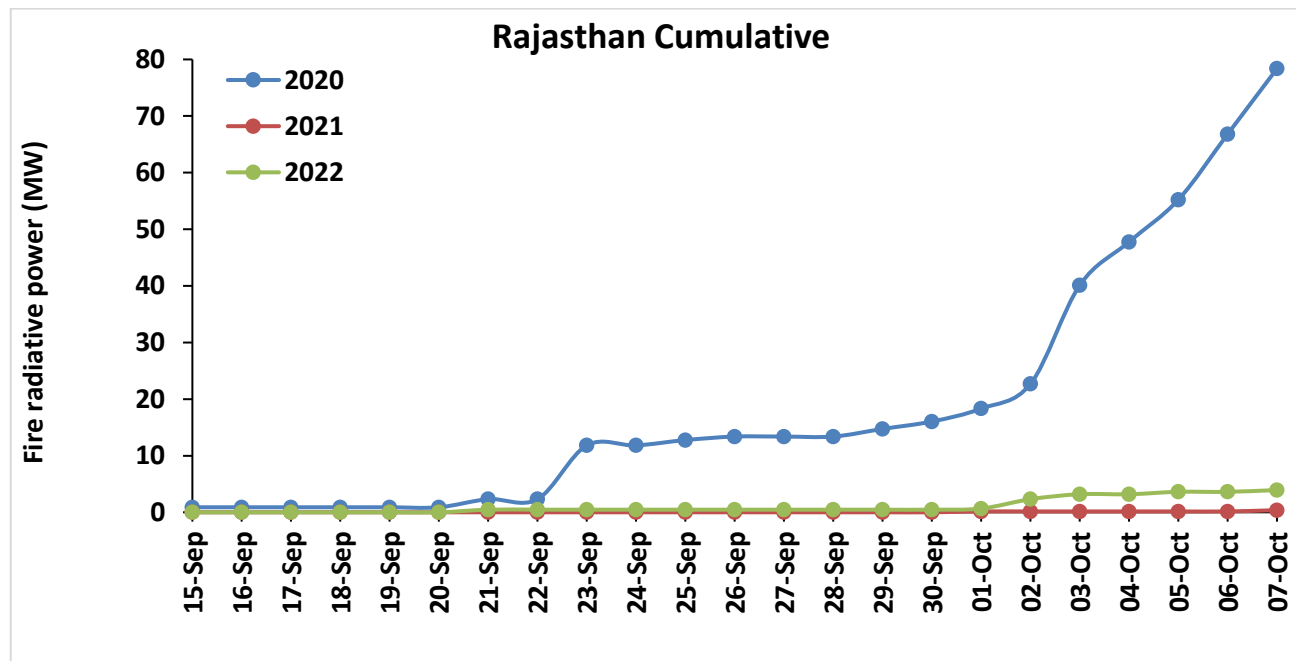
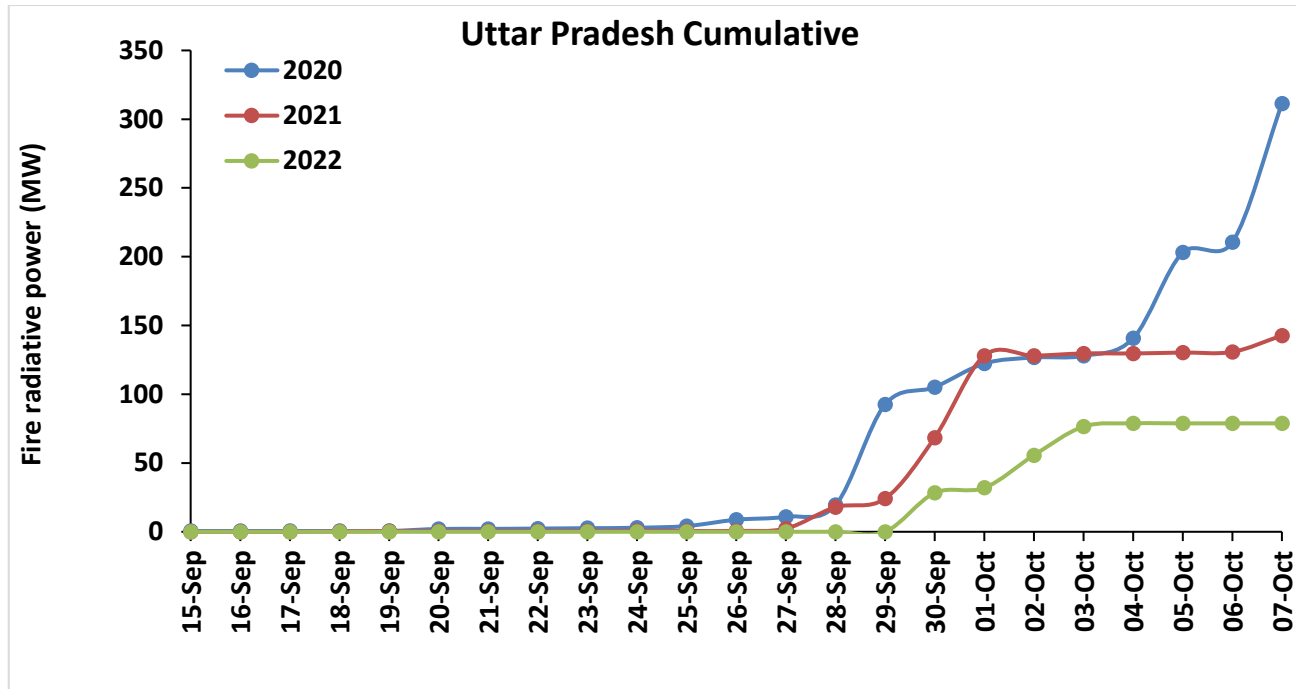


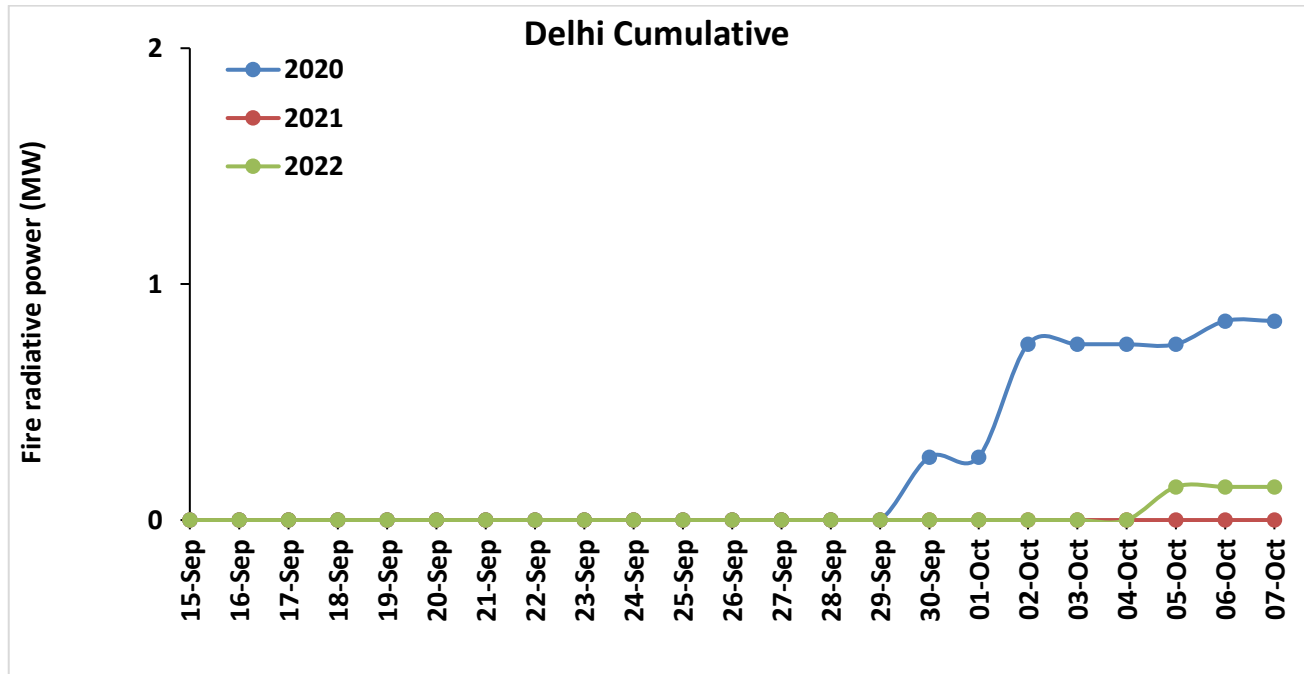
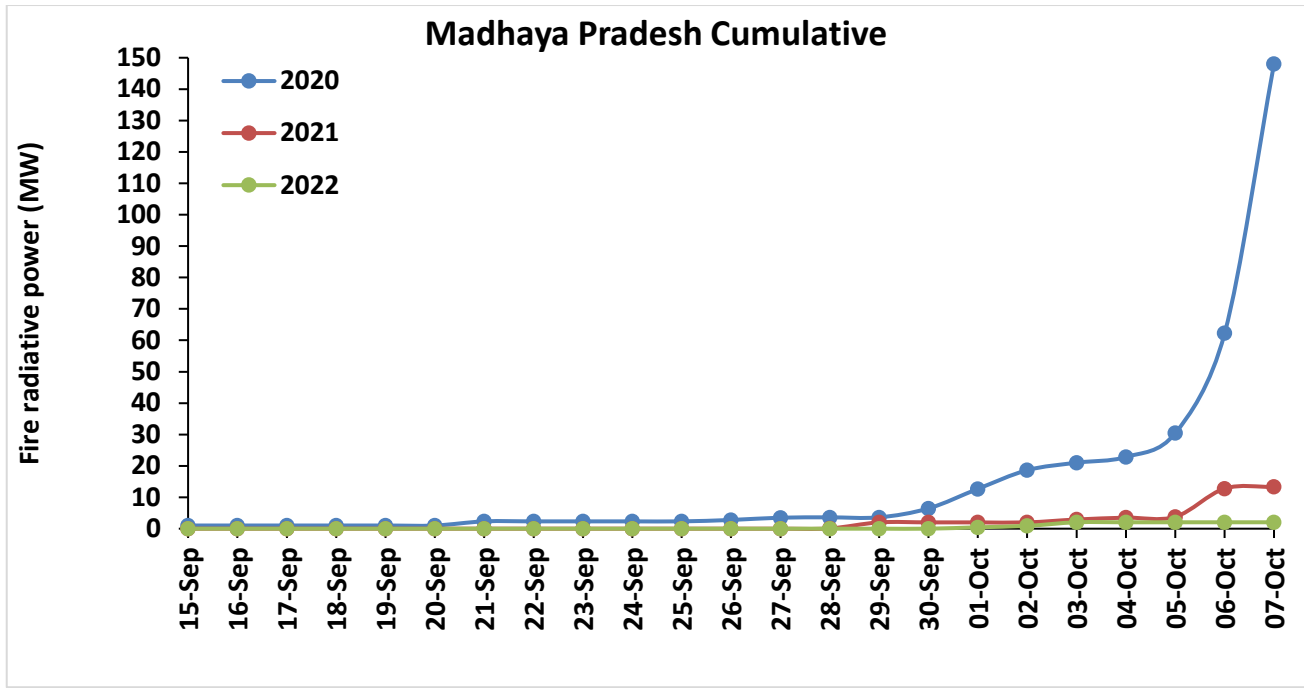




Comparison of residue burning fire power in current year (2022) with previous years (2021 and 2020) for the study States

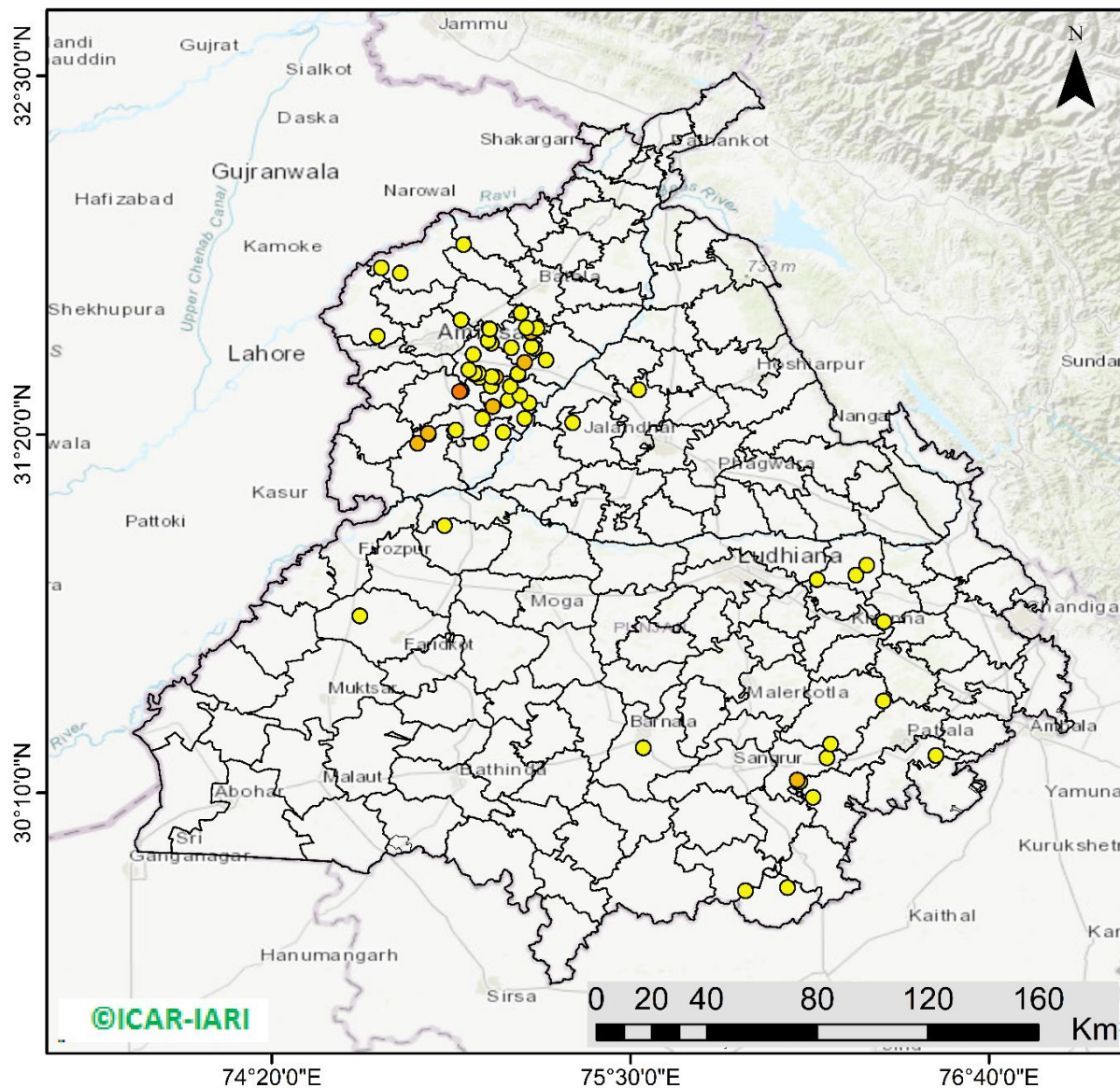






Punjab

RICE RESIDUE BURNING IN PUNJAB



62 burning events detected in Punjab during (07th Oct 2022)

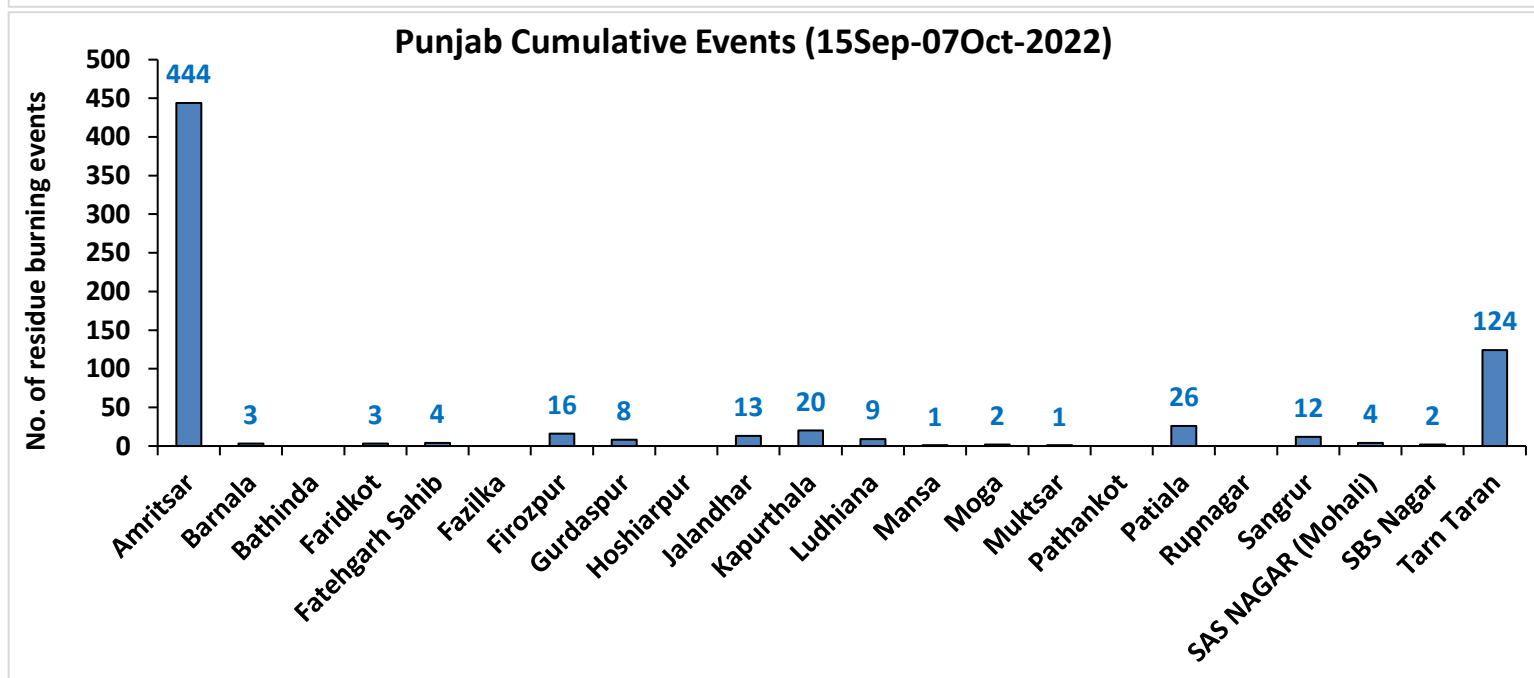
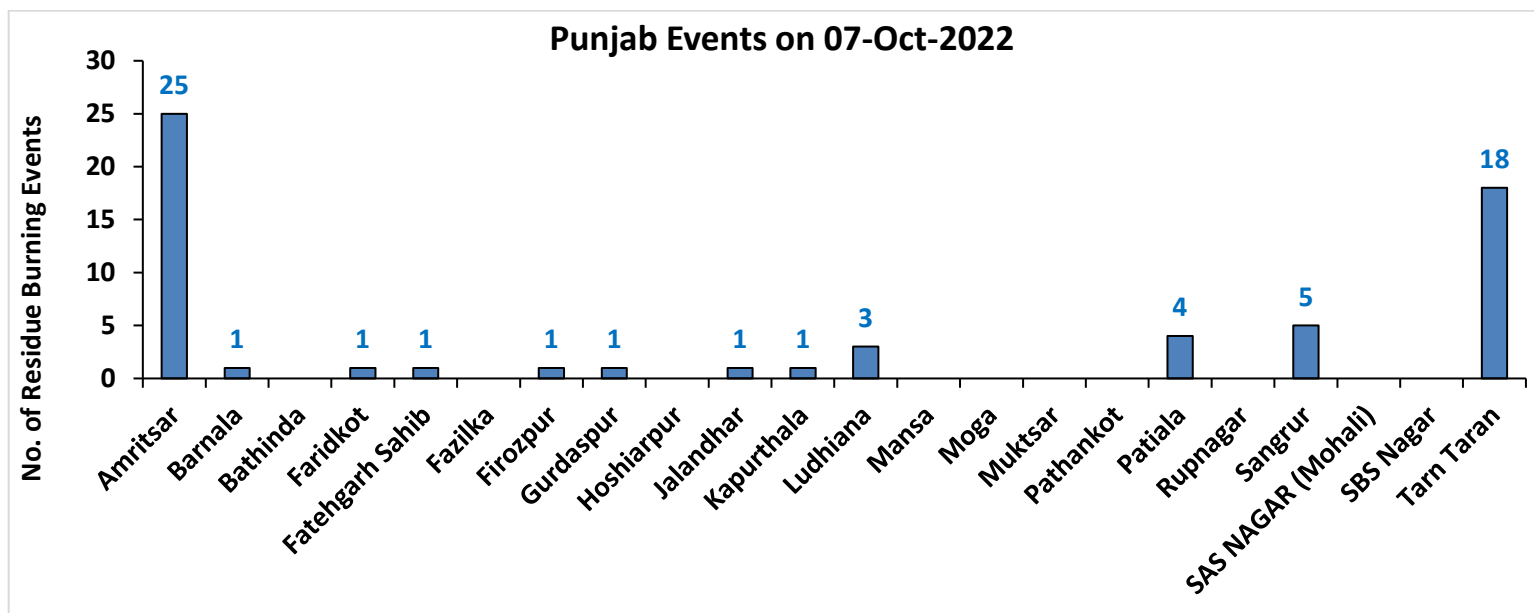
Fire Intensity (W/m²)

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



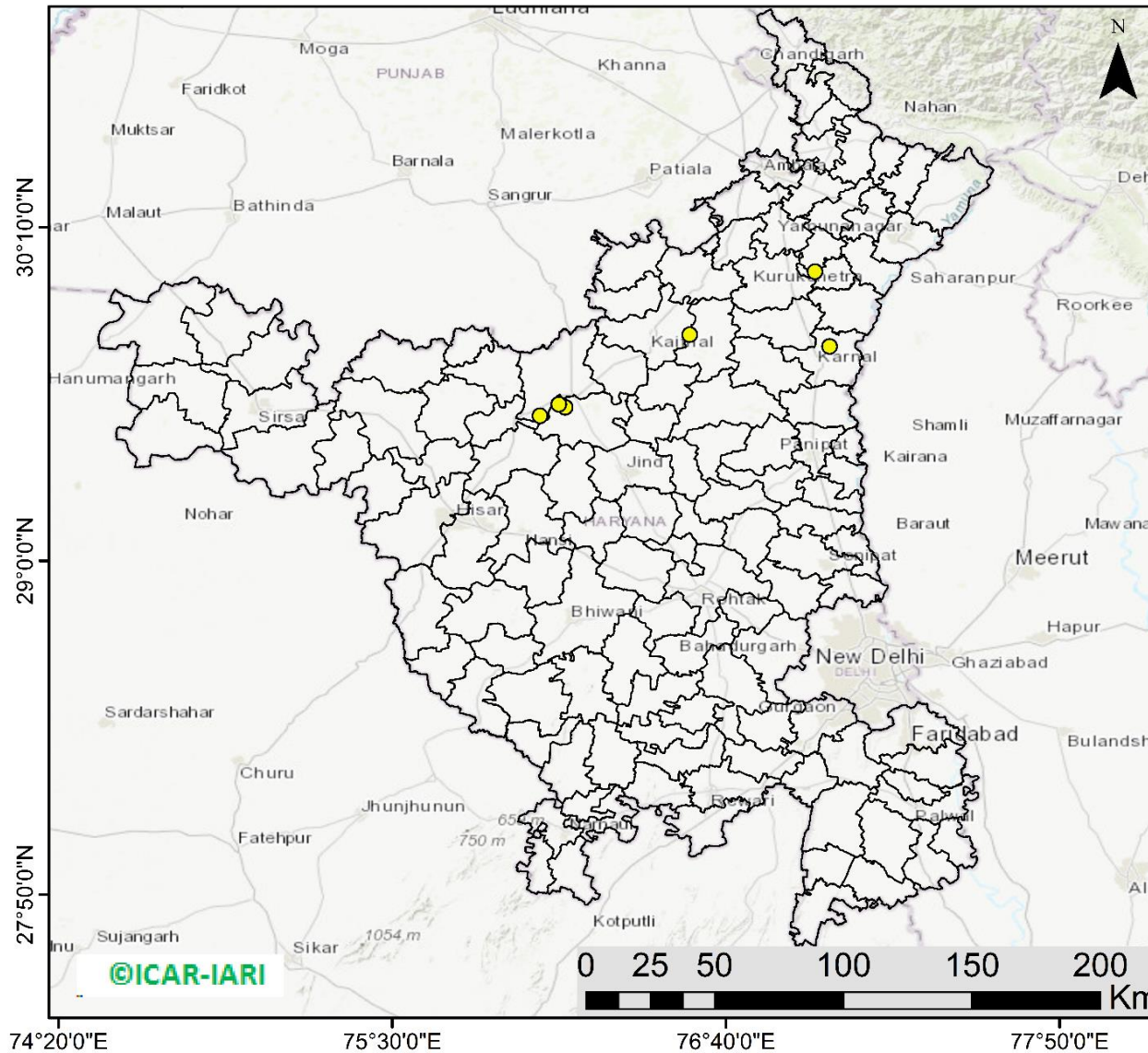
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Punjab (15Sep- 07Oct-2022)



Haryana

RICE RESIDUE BURNING IN HARYANA



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

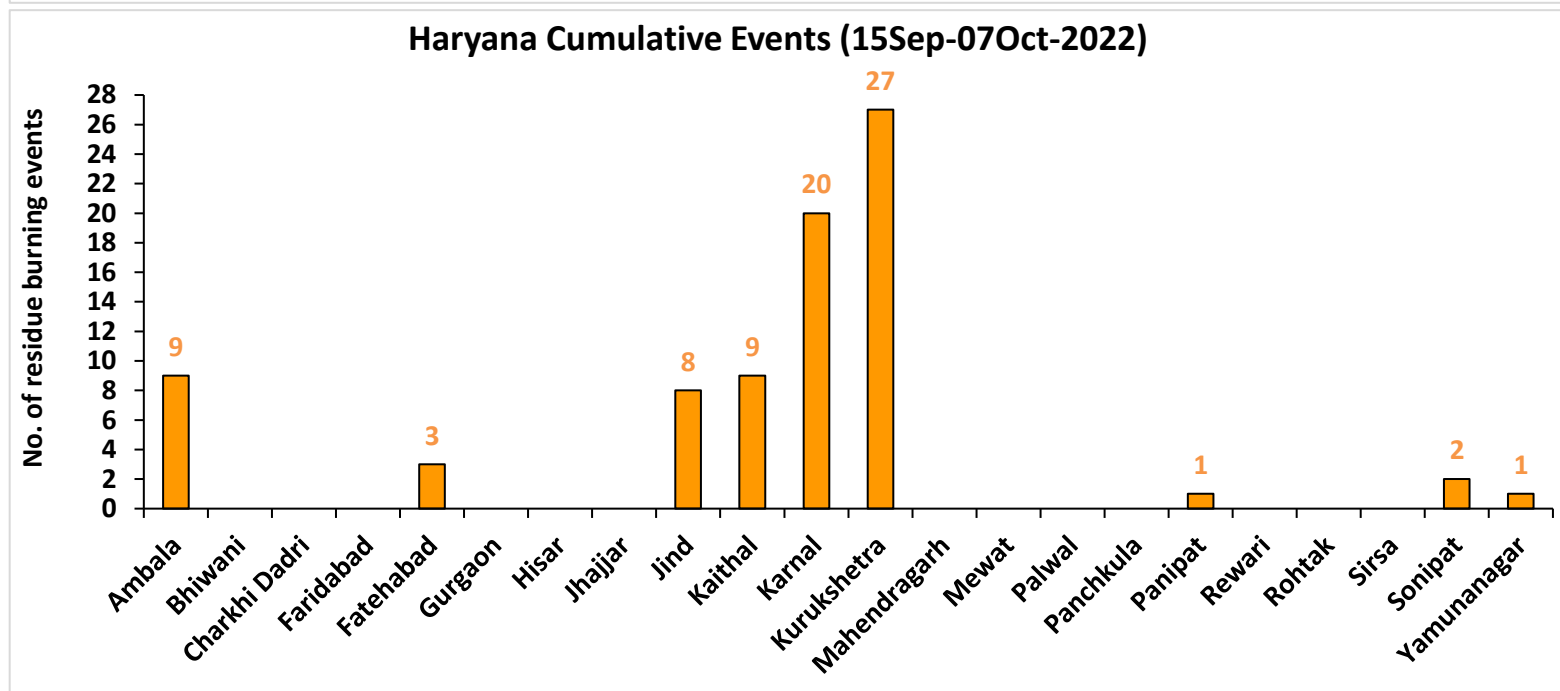
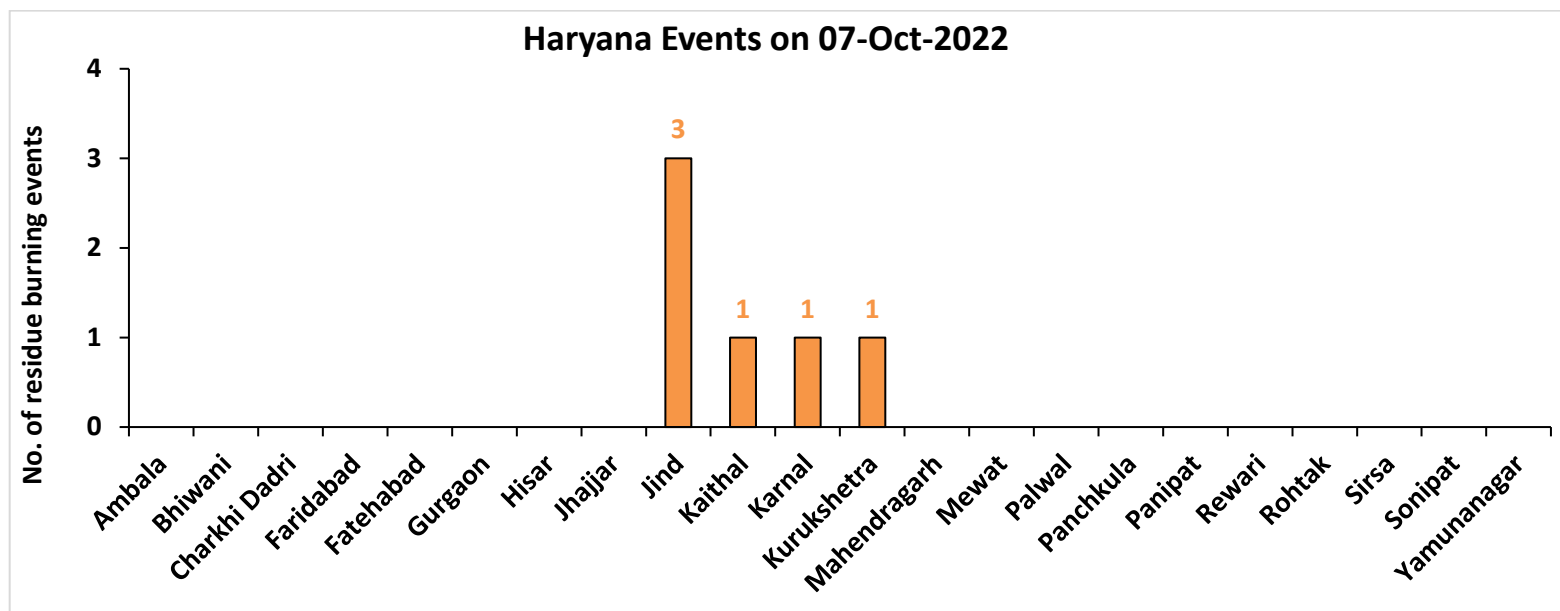
Fire Intensity (W/m²)

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



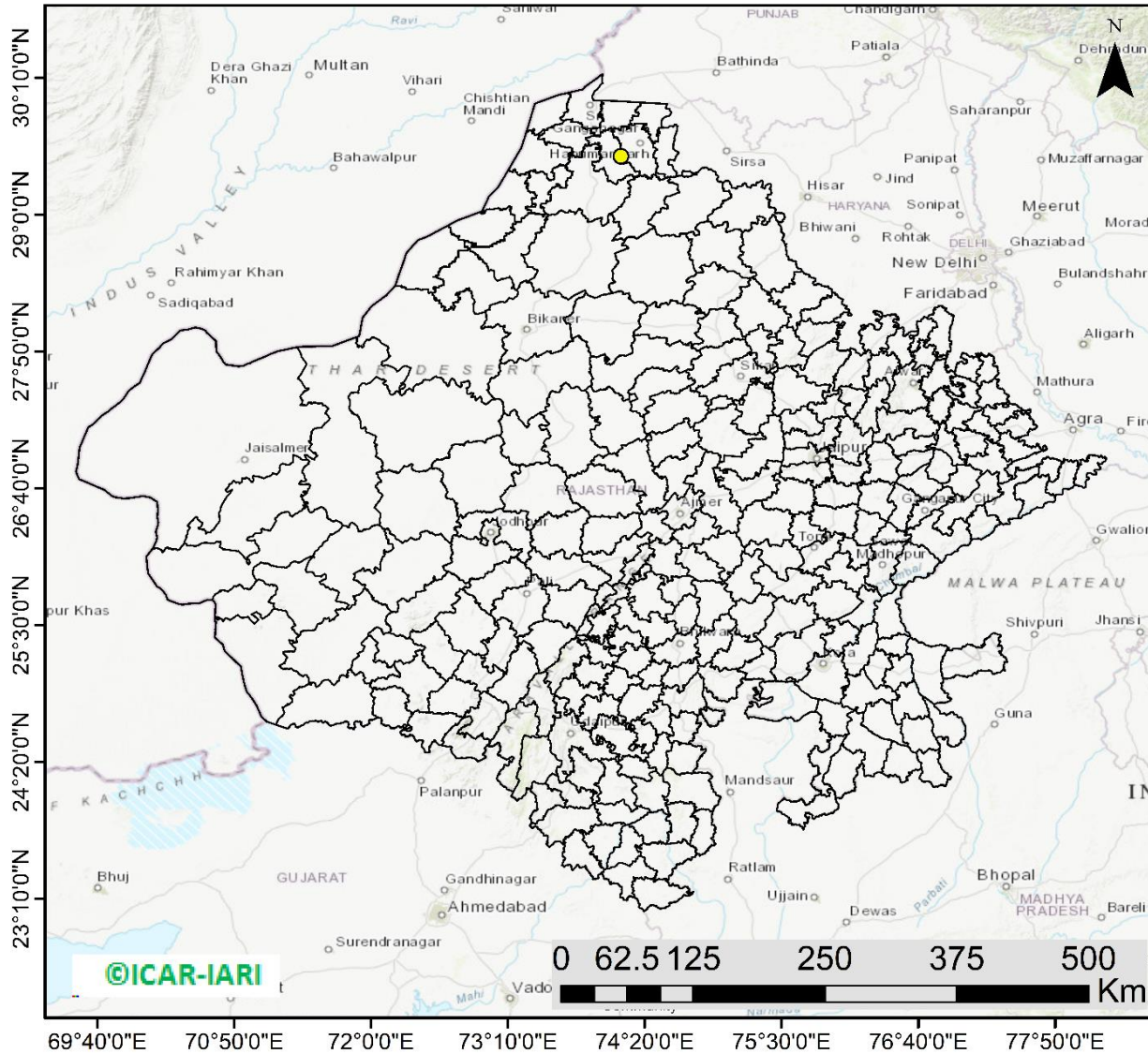
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Haryana (15Sep- 07Oct-2022)



Rajasthan

RICE RESIDUE BURNING IN RAJASTHAN



01 burning events detected in Rajasthan on (07th Oct 2022)

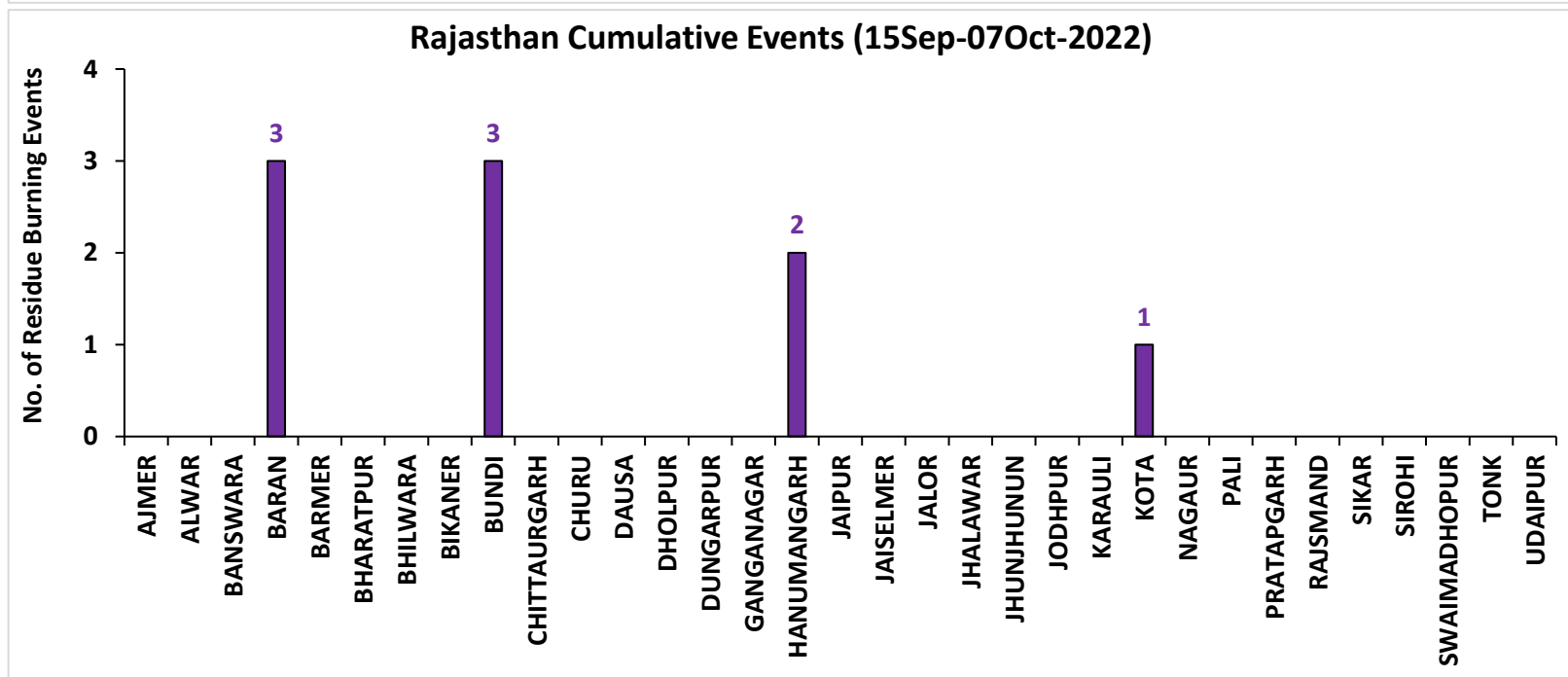
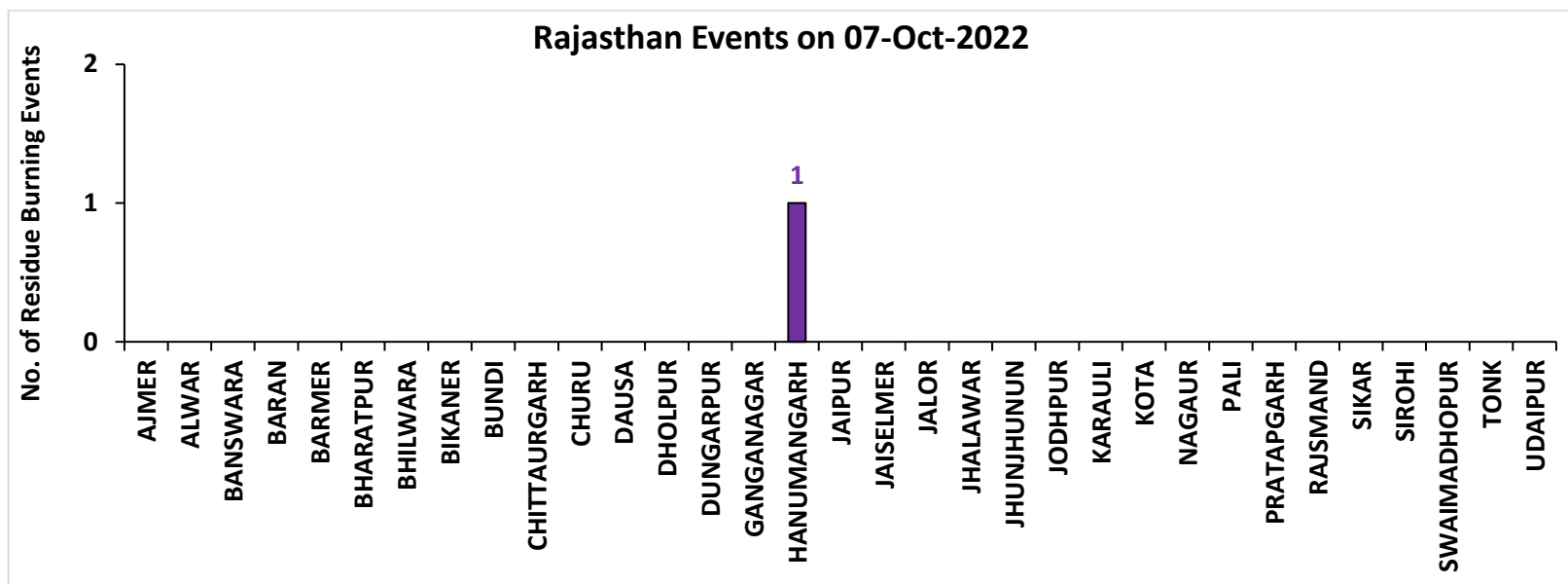
Fire Intensity (W/m²)

- 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- 07Oct -2022)



District-wise cumulative number of residues burning events detected in 2020 ,2021 and 2022
(Period: 15 September-07 October)

(a) Punjab

District	15 Sep-07 Oct 2022		
	2020	2021	2022
Amritsar	1211	218	444
Barnala	5	0	3
Bathinda	0	0	0
Faridkot	12	13	3
Fatehgarh Sahib	26	5	4
Fazilka	1	1	0
Firozpur	50	9	16
Gurdaspur	96	5	8
Hoshiarpur	4	0	0
Jalandhar	21	9	13
Kapurthala	32	6	20
Ludhiana	56	28	9
Mansa	4	0	1
Moga	14	2	2
Muktsar	1	1	1
Pathankot	0	0	0
Patiala	99	18	26
Rupnagar	5	1	0
Sangrur	44	4	12
SAS NAGAR (Mohali)	10	3	4
SBS Nagar	4	1	2
Tarn Taran	437	68	124
Total	2132	392	692

(b) Haryana

District	15 Sep-07 Oct 2022		
	2020	2021	2022
AMBALA	32	2	9
BHIWANI	0	0	0
CHARKHI DADRI	0	0	0
FARIDABAD	0	0	0
FATEHABAD	18	1	3
GURGAON	0	0	0
HISAR	3	0	0
JHAJJAR	1	0	0
JIND	3	0	8
KAITHAL	34	5	9
KARNAL	62	11	20
KURUKSHETRA	53	13	27
MAHENDRAGARH	0	0	0
MEWAT	0	0	0
PALWAL	2	1	0
PANCHKULA	0	0	0
PANIPAT	6	0	1
REWARI	0	0	0
ROHTAK	0	0	0
SIRSA	2	0	0
SONIPAT	6	1	2
YAMUNANAGAR	17	1	1
Total	239	35	80

(c) Uttar Pradesh

District	15 Sep-07 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	13	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	5	6	0
AMETHI	0	0	0	HAMIRPUR	0	0	0	SAMBHAL	6	0	4
AMROHA	1	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	8	48	53
BADAUN	0	0	0	JALAUN	0	0	0	SHAMLI	15	2	2
BAGHPAT	1	0	0	JAUNPUR	0	0	0	SHARANPUR	10	0	0
BAHRAICH	1	0	0	JHANSI	4	0	0	SHRAWASTI	0	0	0
BALLIA	0	0	0	KANNAUJ	2	0	0	SIDDHARTHANAGAR	0	0	0
BALRAMPUR	0	0	0	KANPUR	0	1	0	SITAPUR	3	1	0
BANDA	0	0	0	KANPUR DEHAT	1	0	0	SONBHADRA	0	0	0
BARABANKI	4	0	0	KASGANJ	1	0	0	SULTANPUR	0	0	0
BAREILLY	5	0	0	KAUSHAMBI	5	0	0	UNNAO	2	0	0
BASTI	0	0	0	KHERI	9	3	8	VARANASI	0	0	0
BIJNOR	3	0	1	KUSHINAGAR	0	0	0	Total	142	65	80
BULANDSAHAR	1	0	2	LALITPUR	0	1	2				
CHANDAULI	0	0	0	LUCKNOW	1	0	0				
CHITRAKOOT	0	0	0	MAHARAJGANJ	0	0	0				
DEORIA	0	0	0	MAHOBA	0	0	0				
ETAH	3	0	0	MAINPURI	0	1	0				
ETAWAH	0	0	0	MATHURA	3	1	0				
FAIZABAD	0	0	0	MAU	0	0	0				
FARRUKHABAD	0	0	0	MEERUT	8	0	0				
FATEHPUR	4	0	0	MIRZAPUR	0	0	0				
FIROZABAD	1	0	0	MORADABAD	1	0	0				

(d) Delhi

District	15 Sep-07 Oct 2022		
	2020	2021	2022
CENTRAL	0	0	0
EAST	0	0	0
NEW DELHI	0	0	0
NORTH	2	0	2
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	3	0	2

(e) Rajasthan

District	15 Sep-07 Oct 2022		
	2020	2021	2022
AJMER	0	0	0
ALWAR	1	0	0
BANSWARA	0	0	0
BARAN	48	0	3
BARMER	2	0	0
BHARATPUR	0	0	0
BHILWARA	2	0	0
BIKANER	0	0	0
BUNDI	1	0	3
CHITTAURGARH	0	1	0
CHURU	0	0	0
DAUSA	0	0	0
DHOLPUR	0	0	0
DUNGARPUR	0	0	0
GANGANAGAR	2	0	0
HANUMANGARH	12	1	2
JAIPUR	0	0	0
JAISELMER	2	0	0
JALOR	0	0	0
JHALAWAR	0	0	0
JHUNJHUNUN	1	0	0
JODHPUR	1	0	0
KARAULI	1	0	0
KOTA	13	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	88	2	9

(f) Madhya Pradesh

District	15 Sep-07 Oct 2022						
	2020	2021	2022				
				PANNA	0	0	0
ALIRAJPUR	0	0	0	RAISEN	2	0	0
ANUPPUR	0	0	0	RAJGARH	1	0	2
ASHOKNAGAR	6	0	0	RATLAM	0	0	0
BALAGHAT	0	0	0	REWA	1	0	0
BARWANI	0	0	0	SAGAR	7	2	1
BETUL	0	0	0	SATNA	3	0	0
BHIND	0	0	0	SEHORE	4	0	1
BHOPAL	2	0	0	SEONI	1	0	0
BURHANPUR	0	0	0	SHAHDOL	0	0	0
CHHATARPUR	2	0	0	SHAJAPUR	4	0	0
CHHINDWARA	0	0	0	SHEOPUR	2	0	0
DAMOH	6	0	0	SHIVPURI	0	0	0
DATIA	2	0	0	SIDHI	0	0	0
DEWAS	2	0	0	SINGRAULI	0	0	0
DHAR	13	0	0	TIKAMGARH	0	0	0
DINDORI	0	0	0	UJJAIN	5	0	0
EAST NIMAR	0	1	0	UMARIA	0	0	0
GUNA	7	1	1	VIDESHA	23	1	1
GWALIOR	13	0	1	WEST NIMAR	1	0	0
HARDA	8	6	0	Total	128	11	7
HOSHANGABAD	3	0	0				
INDORE	1	0	0				
JABALPUR	4	0	0				
JHABUA	0	0	0				
KATNI	0	0	0				
MANDLA	0	0	0				
MANDSAUR	0	0	0				
MORENA	5	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 - 07 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
05-Oct	161	18	130	17	3	24	14	2	0	0	0	2	14	0	1	13	1	0
06-Oct	171	42	85	30	0	26	12	1	0	1	0	0	16	0	0	37	1	0
07-Oct	197	72	62	32	11	6	41	13	0	0	0	0	14	1	1	31	1	0
Total	2132	392	692	239	35	80	142	65	80	3	0	2	88	2	9	128	11	7

Details of residue burning events in Punjab on 07-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	AMRITSAR	AJNALA	S-NPP	31.85760	74.75130	13:29:41	D	1.70
2	AMRITSAR	AJNALA	S-NPP	31.87520	74.68910	13:29:41	D	4.00
3	AMRITSAR	CHOGAWAN	S-NPP	31.65290	74.67630	13:29:41	D	4.30
4	AMRITSAR	JANDIALA GURU	S-NPP	31.51930	75.06160	13:29:41	D	5.40
5	AMRITSAR	JANDIALA GURU	S-NPP	31.52920	74.99300	13:29:41	D	8.90
6	AMRITSAR	JANDIALA GURU	S-NPP	31.53110	75.00510	13:29:41	D	2.60
7	AMRITSAR	JANDIALA GURU	S-NPP	31.53220	74.99280	13:29:41	D	3.10
8	AMRITSAR	JANDIALA GURU	S-NPP	31.54300	74.97400	13:29:41	D	3.20
9	AMRITSAR	JANDIALA GURU	S-NPP	31.59290	74.98850	13:29:41	D	2.50
10	AMRITSAR	RAYYA	S-NPP	31.52700	75.13470	13:29:41	D	4.60
11	AMRITSAR	RAYYA	S-NPP	31.53030	75.13400	13:29:41	D	4.60
12	AMRITSAR	RAYYA	S-NPP	31.57440	75.22500	13:29:41	D	4.90
13	AMRITSAR	TARSIKKA	S-NPP	31.56730	75.15580	13:29:41	D	5.10
14	AMRITSAR	TARSIKKA	S-NPP	31.61310	75.18790	13:29:41	D	2.80
15	AMRITSAR	TARSIKKA	S-NPP	31.61520	75.11260	13:29:41	D	1.80
16	AMRITSAR	TARSIKKA	S-NPP	31.61850	75.17850	13:29:41	D	4.80
17	AMRITSAR	TARSIKKA	S-NPP	31.62910	75.04740	13:29:41	D	4.40
18	AMRITSAR	TARSIKKA	S-NPP	31.63780	75.03730	13:29:41	D	2.90
19	AMRITSAR	TARSIKKA	S-NPP	31.66260	75.17770	13:29:41	D	5.20
20	AMRITSAR	TARSIKKA	S-NPP	31.66590	75.17700	13:29:41	D	5.20
21	AMRITSAR	TARSIKKA	S-NPP	31.67520	75.04210	13:29:41	D	2.60
22	AMRITSAR	TARSIKKA	S-NPP	31.67810	75.19540	13:29:41	D	1.00
23	AMRITSAR	TARSIKKA	S-NPP	31.67980	75.16180	13:29:41	D	2.70
24	AMRITSAR	TARSIKKA	S-NPP	31.72810	75.14350	13:29:41	D	2.90
25	AMRITSAR	VERKA	S-NPP	31.70520	74.94850	13:29:41	D	4.80
26	BARNALA	BARNALA	S-NPP	30.31250	75.54200	13:29:41	D	3.10
27	FARIDKOT	FARIDKOT	S-NPP	30.74180	74.62000	13:29:41	D	3.10
28	FATEHGARH SAHIB	KHAMANON	S-NPP	30.72290	76.32480	13:29:41	D	3.20
29	FIROZPUR	ZIRA	S-NPP	31.03600	74.89520	13:29:41	D	2.60
30	GURDASPUR	FATEHGARH CHURIAN	S-NPP	31.95050	74.95700	13:29:41	D	1.50

31	JALANDHAR	JALANDHAR WEST	S-NPP	31.47800	75.52660	13:29:41	D	4.30
32	KAPURTHALA	KAPURTHALA	S-NPP	31.37080	75.31200	13:29:41	D	2.70
33	LUDHIANA	MACHHIWARA	S-NPP	30.85980	76.10730	13:29:41	D	2.60
34	LUDHIANA	MACHHIWARA	S-NPP	30.87470	76.23350	13:29:41	D	2.30
35	LUDHIANA	MACHHIWARA	S-NPP	30.90720	76.26890	13:29:41	D	2.20
36	PATIALA	NABHA	S-NPP	30.32510	76.15130	13:29:41	D	3.40
37	PATIALA	NABHA	S-NPP	30.46530	76.32320	13:29:41	D	2.50
38	PATIALA	SAMANA	S-NPP	30.15140	76.09400	13:29:41	D	1.80
39	PATIALA	SANAUR	S-NPP	30.28750	76.49370	13:29:41	D	1.80
40	SANGRUR	ANDANA	S-NPP	29.85790	76.01080	13:29:41	D	4.00
41	SANGRUR	BHAWANIGARH	S-NPP	30.20240	76.05160	13:29:41	D	2.10
42	SANGRUR	BHAWANIGARH	S-NPP	30.20790	76.04230	13:29:41	D	5.90
43	SANGRUR	BHAWANIGARH	S-NPP	30.28020	76.13930	13:29:41	D	1.70
44	SANGRUR	LEHRA GAGA	S-NPP	29.84770	75.87400	13:29:41	D	2.80
45	TARN TARAN	CHOHLA SAHIB	S-NPP	31.30530	75.01360	13:29:41	D	3.20
46	TARN TARAN	CHOHLA SAHIB	S-NPP	31.33990	75.08620	13:29:41	D	3.60
47	TARN TARAN	KHADUR SAHIB	S-NPP	31.38460	75.15570	13:29:41	D	4.90
48	TARN TARAN	KHADUR SAHIB	S-NPP	31.42330	75.05230	13:29:41	D	6.20
49	TARN TARAN	KHADUR SAHIB	S-NPP	31.43450	75.17030	13:29:41	D	1.40
50	TARN TARAN	KHADUR SAHIB	S-NPP	31.44380	75.10220	13:29:41	D	2.40
51	TARN TARAN	KHADUR SAHIB	S-NPP	31.45980	75.14030	13:29:41	D	1.80
52	TARN TARAN	KHADUR SAHIB	S-NPP	31.48910	75.10940	13:29:41	D	1.90
53	TARN TARAN	KHADUR SAHIB	S-NPP	31.48980	75.04690	13:29:41	D	3.60
54	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.34680	74.93140	13:29:41	D	3.50
55	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.38410	75.01900	13:29:41	D	1.60
56	TARN TARAN	PATTI	S-NPP	31.30370	74.80760	13:29:41	D	6.00
57	TARN TARAN	PATTI	S-NPP	31.33310	74.84290	13:29:41	D	5.10
58	TARN TARAN	PATTI	S-NPP	31.33640	74.84220	13:29:41	D	5.10
59	TARN TARAN	TARN TARAN	S-NPP	31.47500	74.95040	13:29:41	D	8.50
60	TARN TARAN	TARN TARAN	S-NPP	31.51790	75.00790	13:29:41	D	3.40
61	TARN TARAN	TARN TARAN	S-NPP	31.52070	75.04880	13:29:41	D	2.80
62	TARN TARAN	TARN TARAN	AQUA	31.47200	74.94400	13:24:06	D	10.50

Details of residue burning events in Haryana on 07-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	JIND	NARWANA	S-NPP	29.50730	76.01680	13:29:41	D	2.90
2	JIND	UCHANA	S-NPP	29.53710	76.10480	13:29:41	D	2.60
3	JIND	UCHANA	S-NPP	29.54730	76.08250	13:29:41	D	2.30
4	KAITHAL	PUNDRI	S-NPP	29.79090	76.54020	13:29:41	D	1.90
5	KARNAL	KARNAL	S-NPP	29.74990	77.02920	13:29:41	D	1.90
6	KURUKSHETRA	BABAIN	S-NPP	30.01150	76.97830	13:29:41	D	2.50

Details of residue burning events in Rajasthan on 07-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	HANUMANGARH	PILIBANGA	S-NPP	29.49630	74.13130	13:29:41	D	2.30

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>)
