



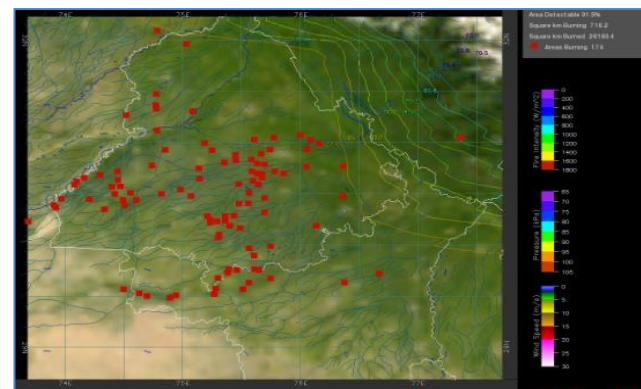
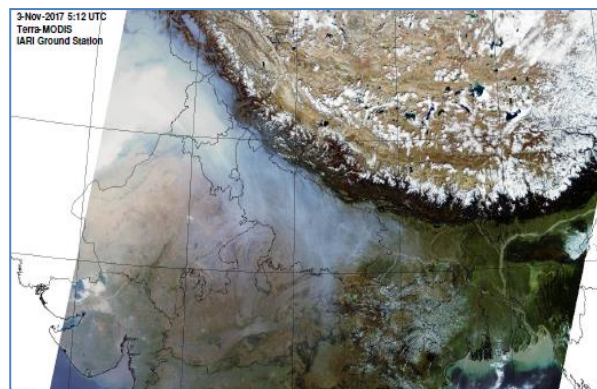
Bulletin No. 31

Events Date:
15-Oct-2022

Issued on:
15-Oct-2022



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



Prepared by:

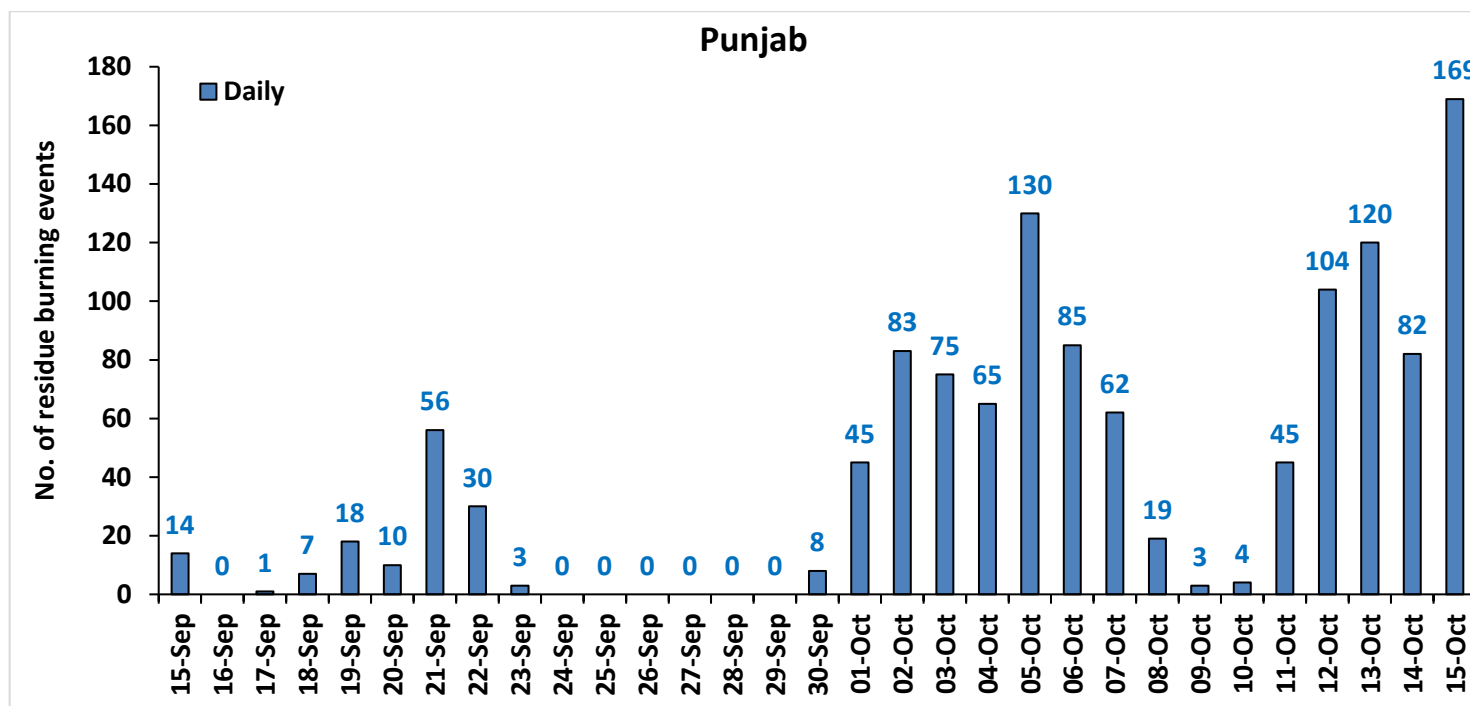
Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012

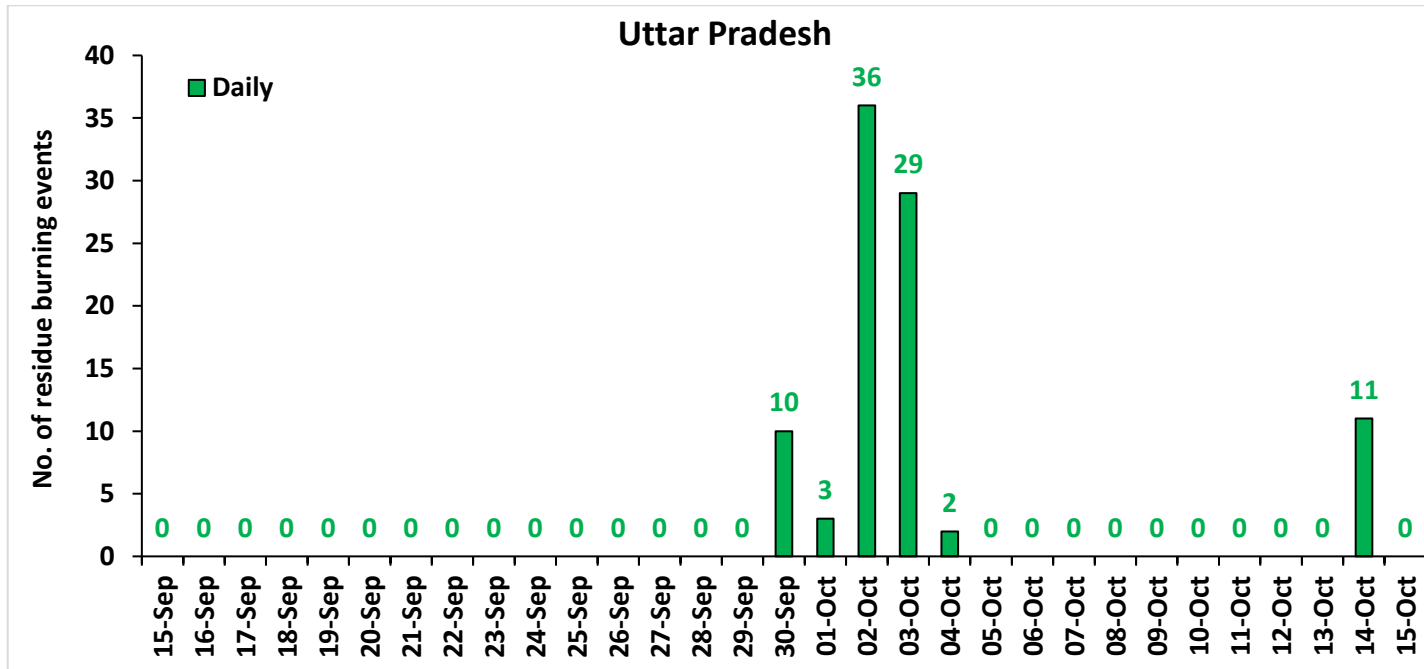
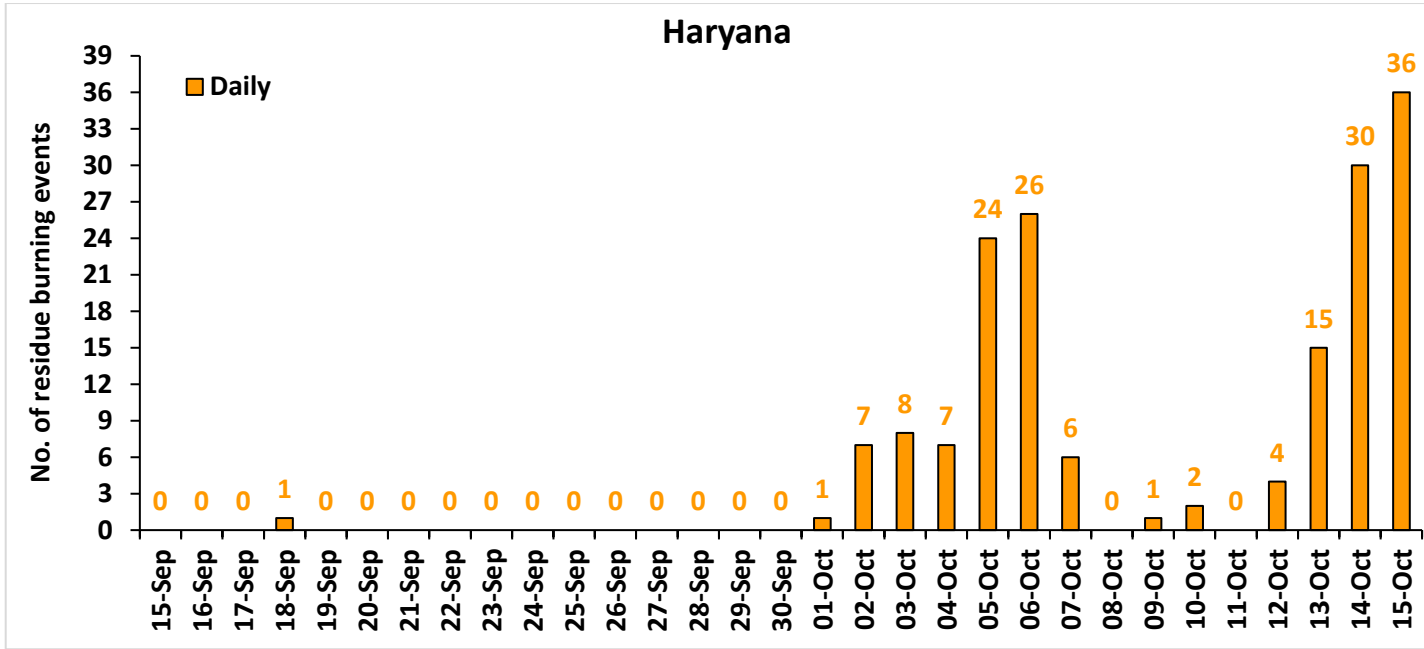
<http://creams.iari.res.in>

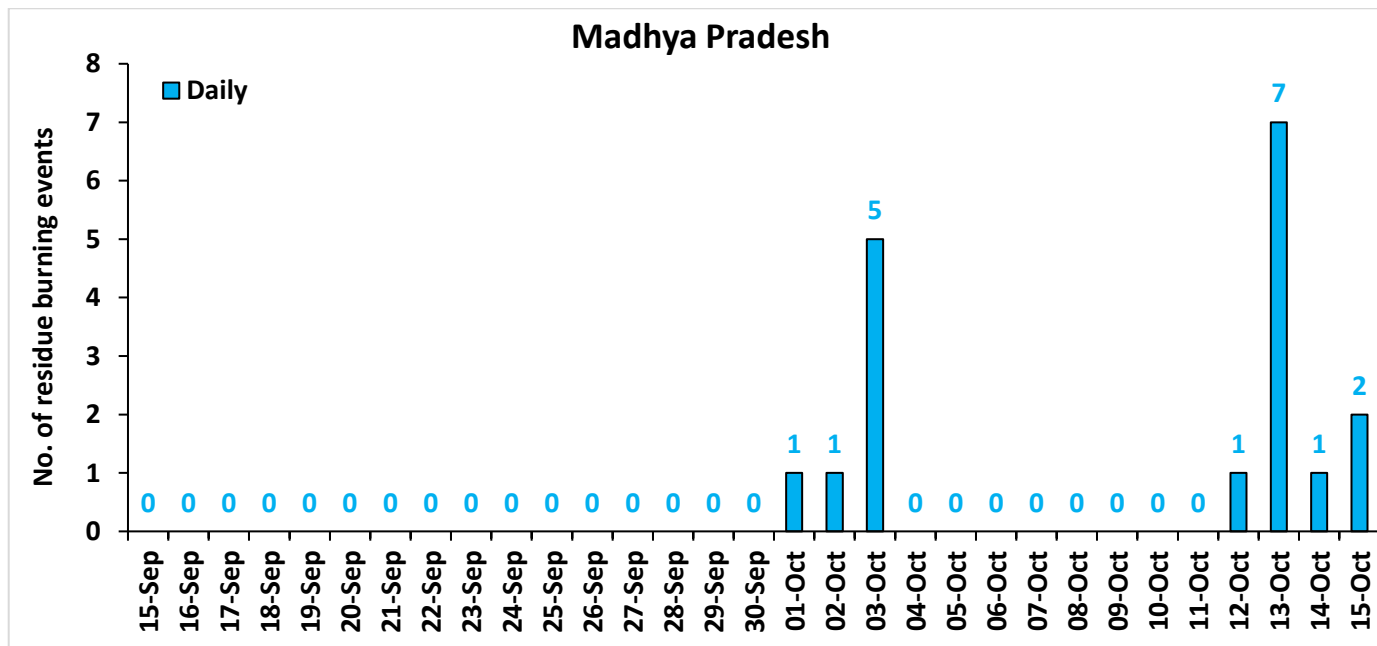
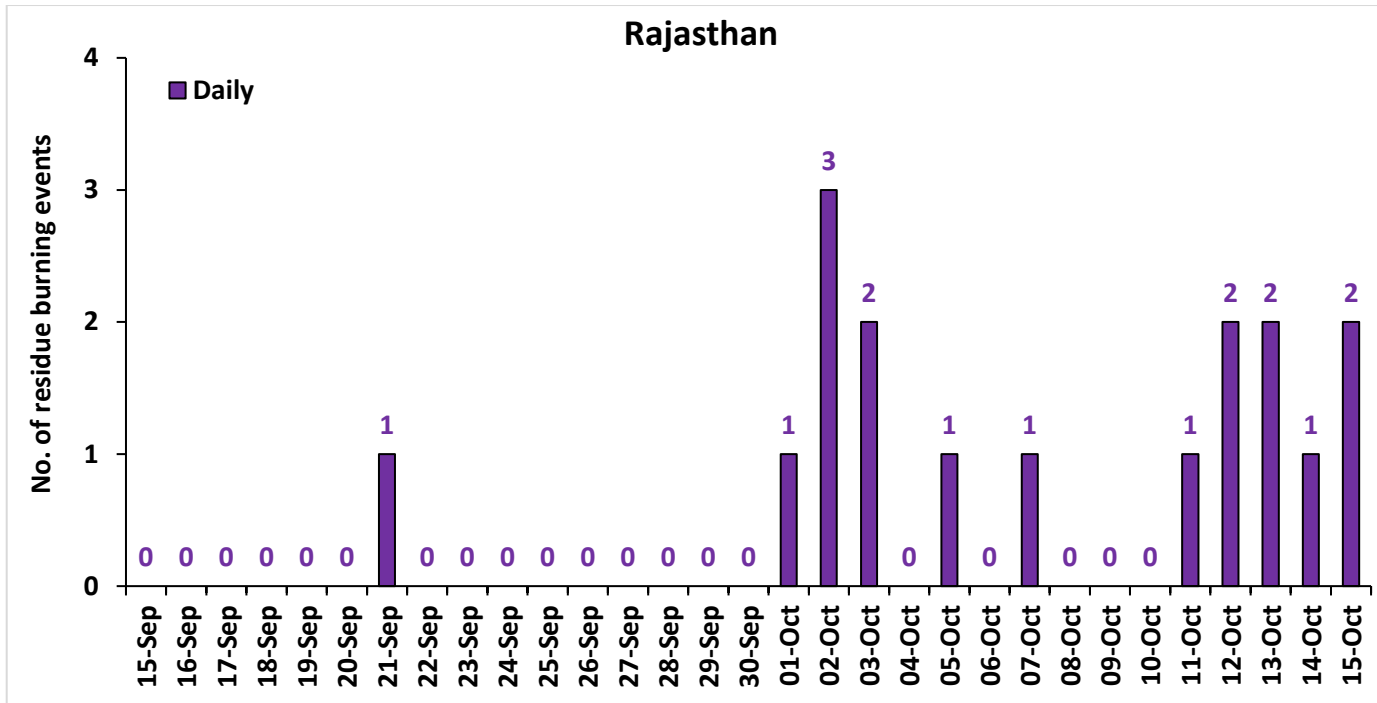
Highlights for 15-Oct-2022

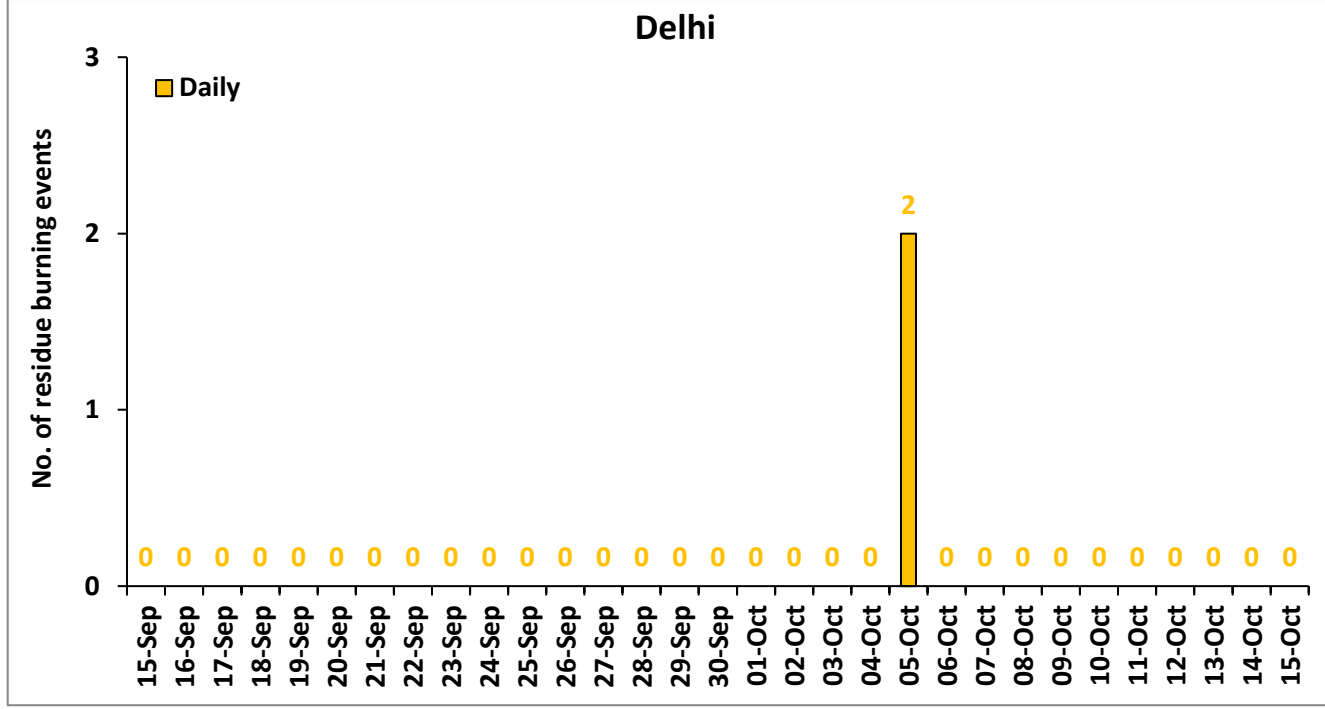
- The active fire events due to rice residue burning were monitored using satellite remote sensing, following the "Standard Protocol for Estimation of Crop Residue Burning Fire Events using Satellite Data".
- Satellites detected **209** residue burning events in the six study States on 15-Oct-2022.
- The state wise events detected on 15-Oct-2022 were **169** in Punjab, **36** in Haryana, **0** in UP, **0** in Delhi, **2** in Rajasthan and **2** in MP.
- Total **1534** burning events were detected in the six states between 15-Sept-2022 and 15-Oct-2022, which are distributed as **1238**, **168**, **91**, **2**, **17** and **18** in Punjab, Haryana, UP, Delhi, Rajasthan and MP, respectively.

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

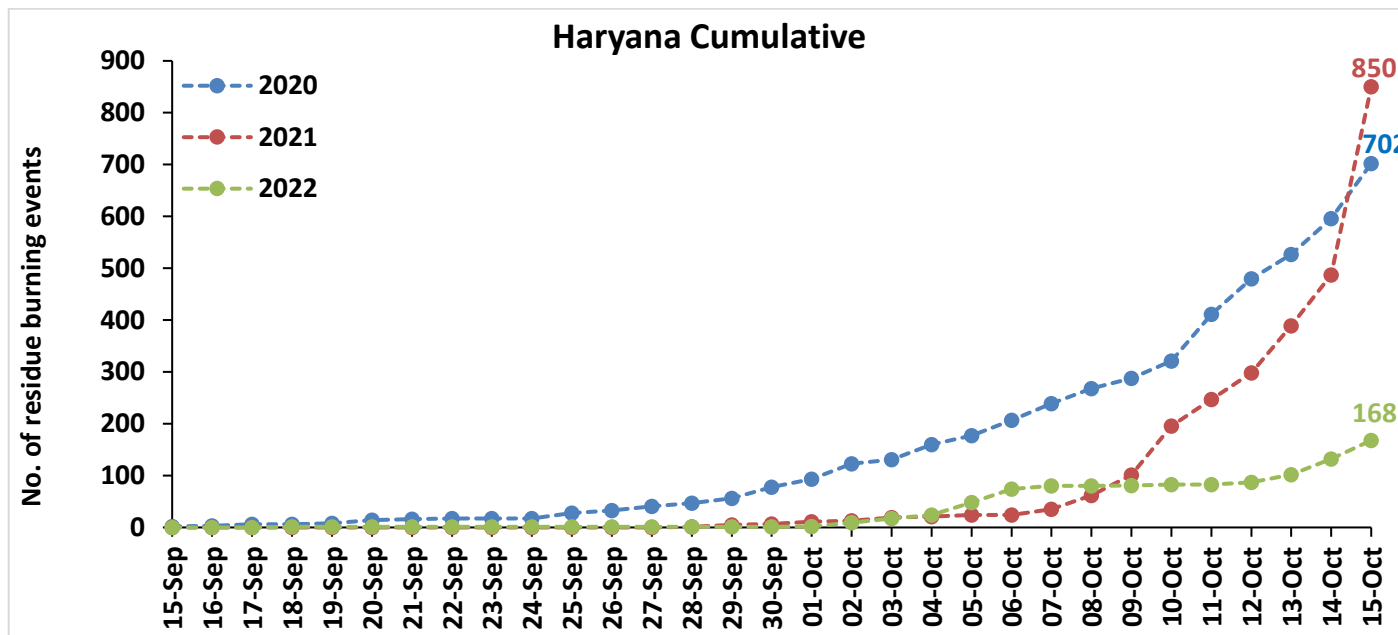
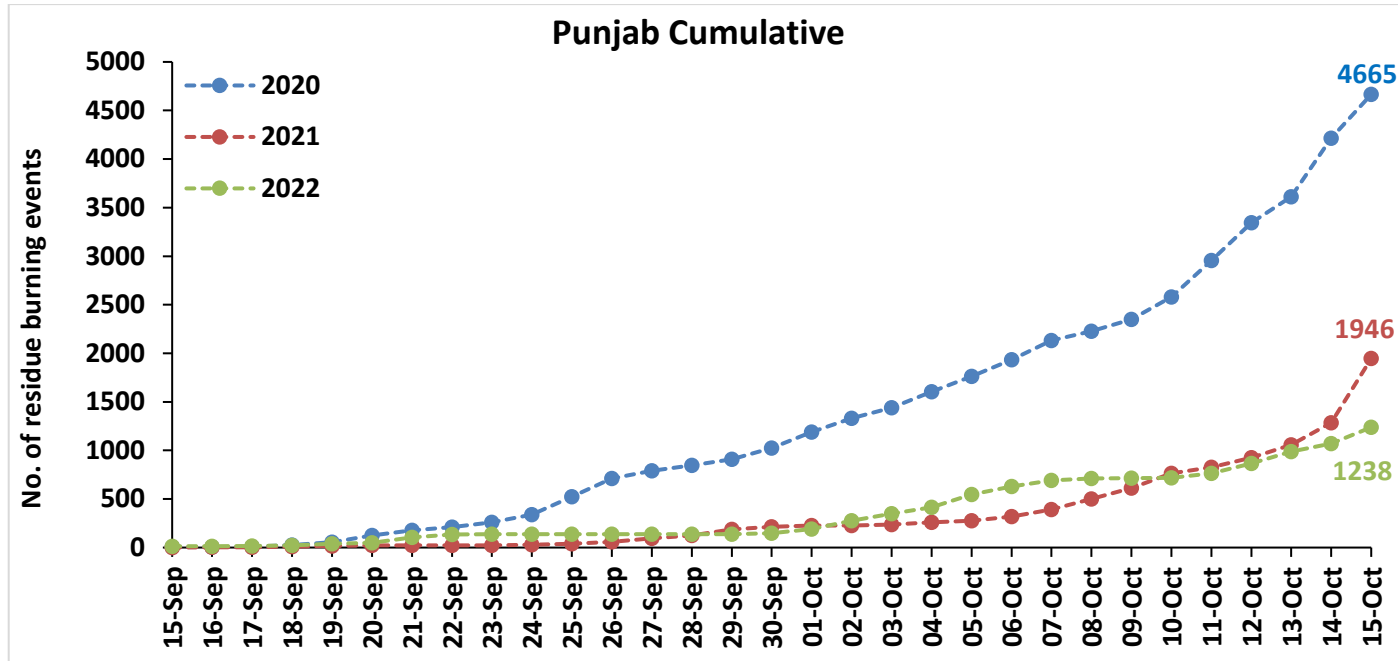


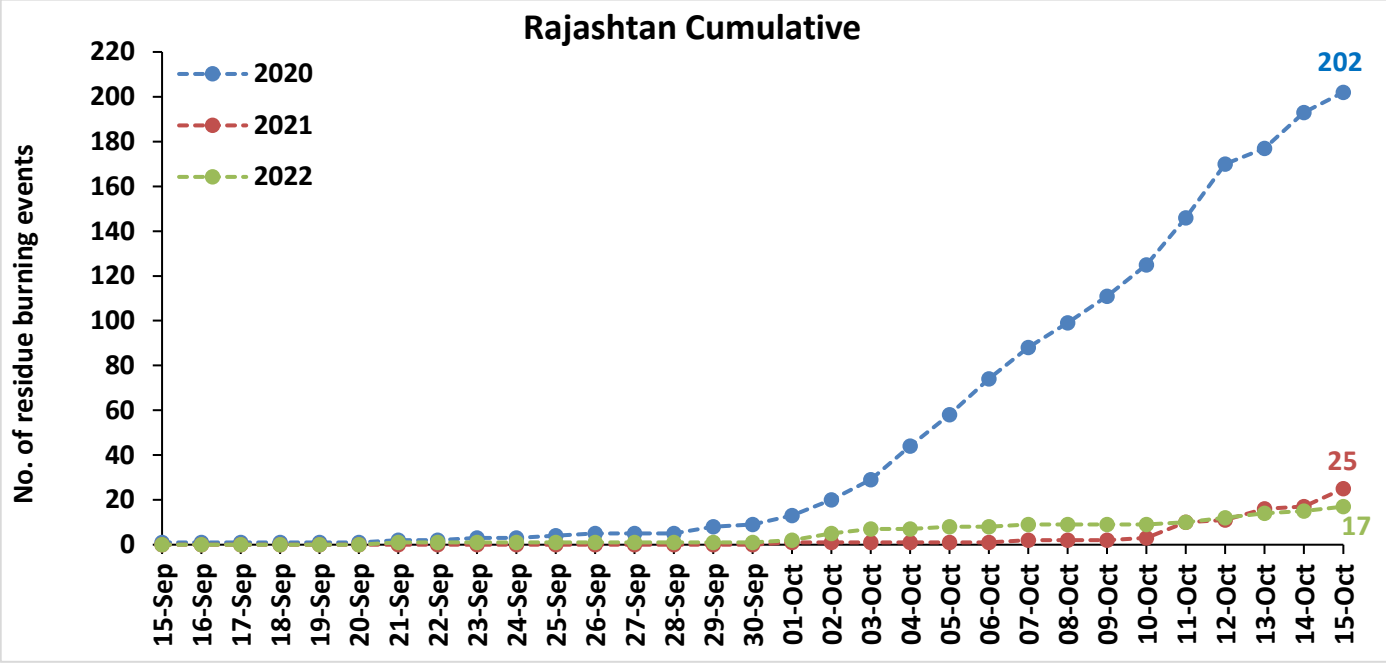
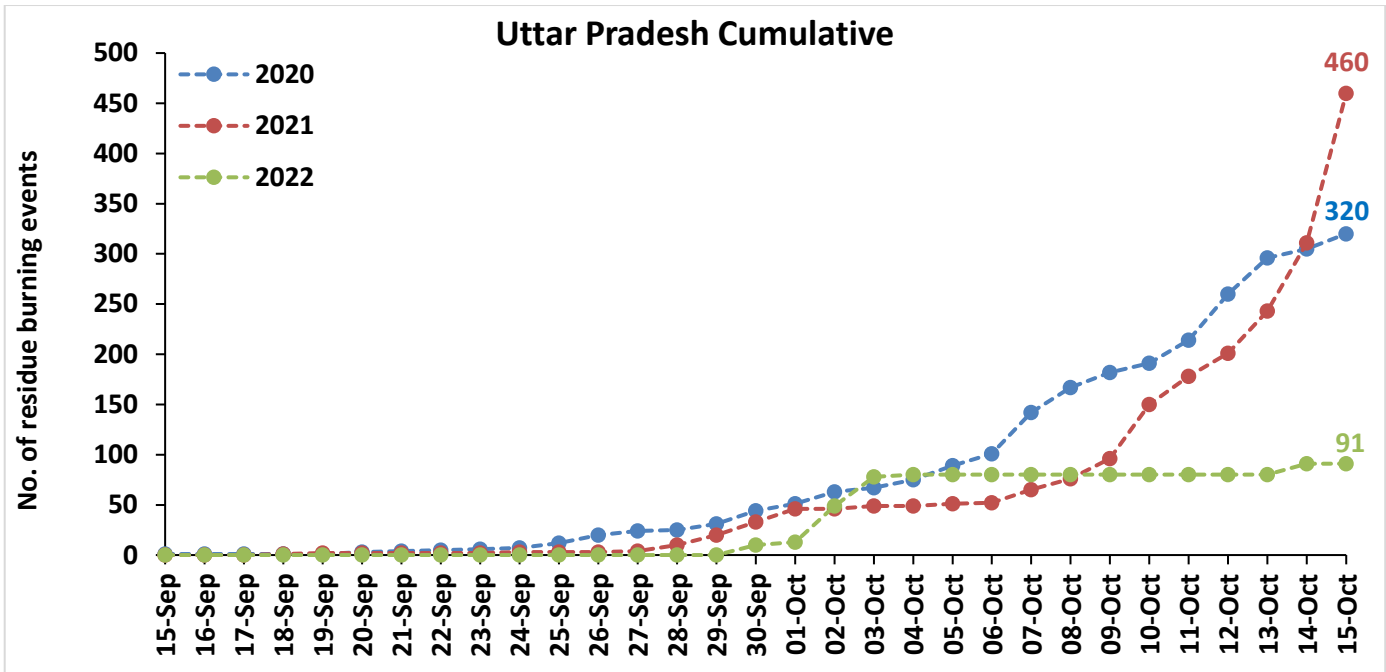


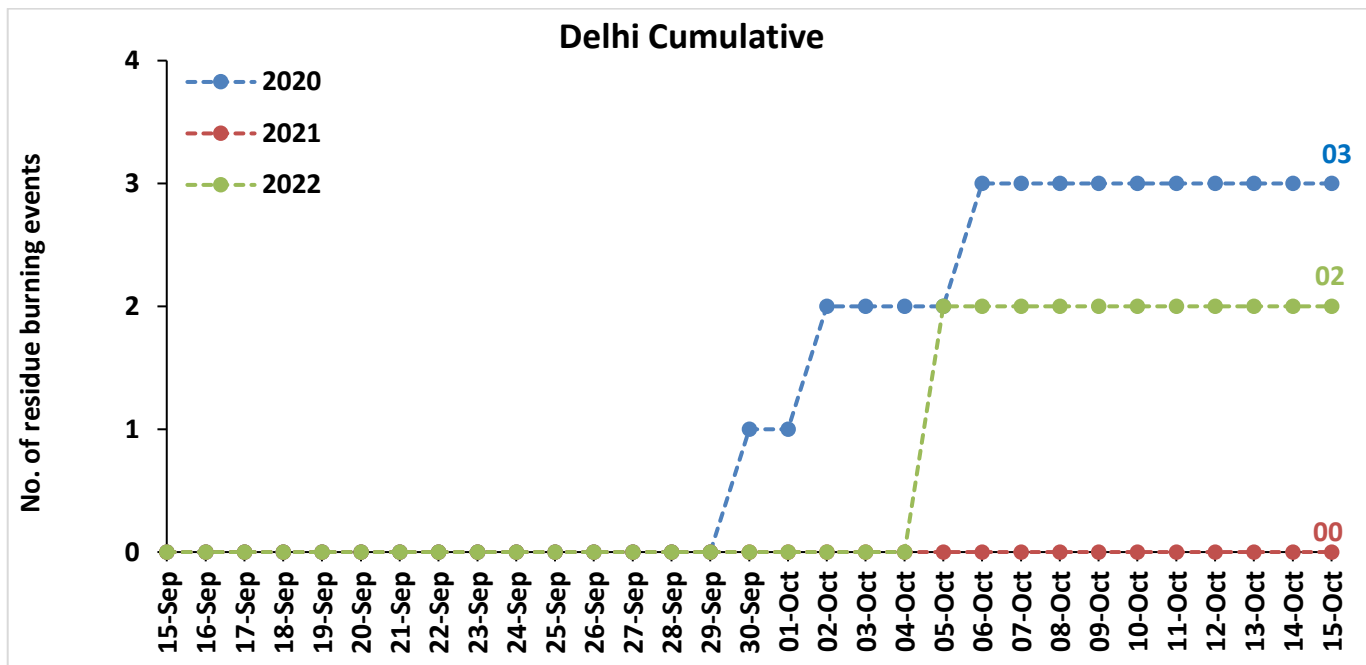
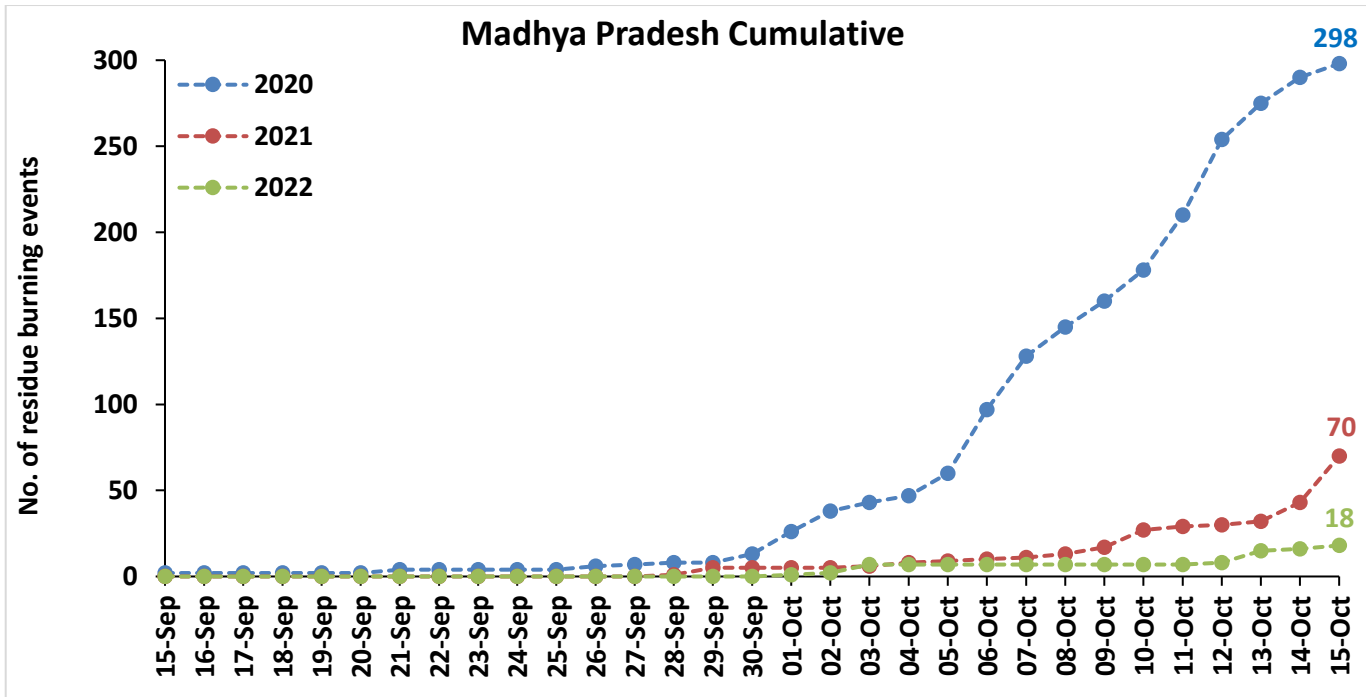




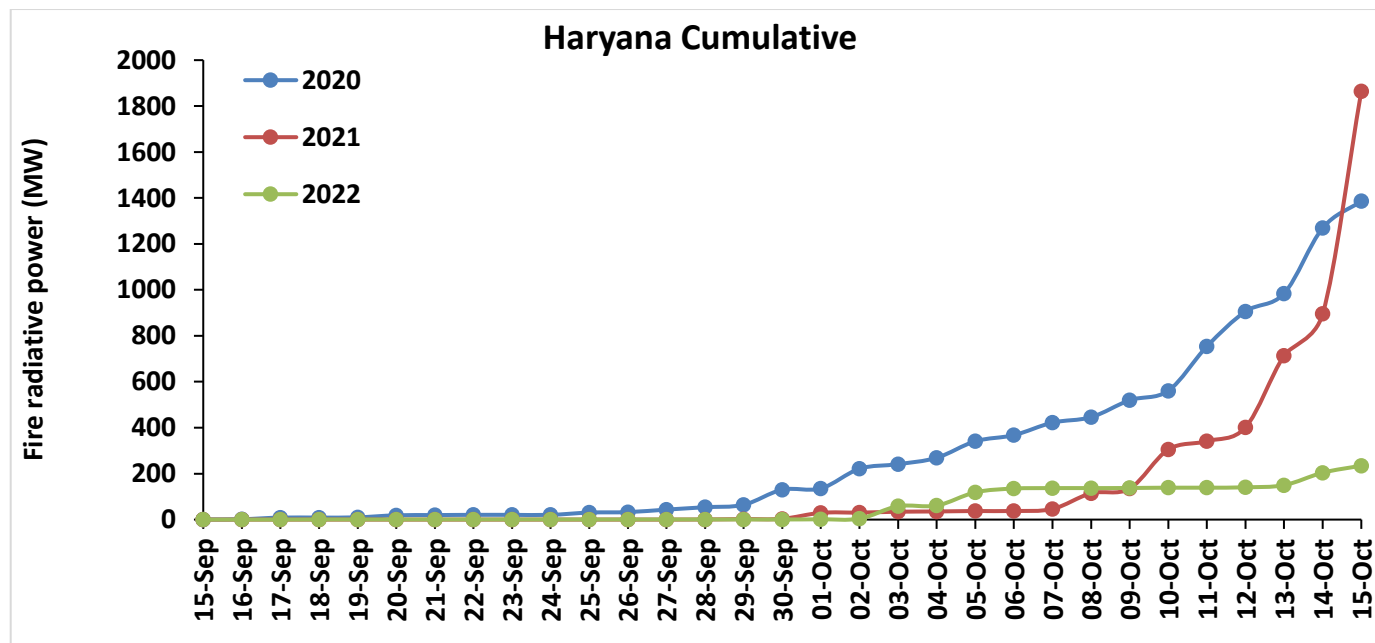
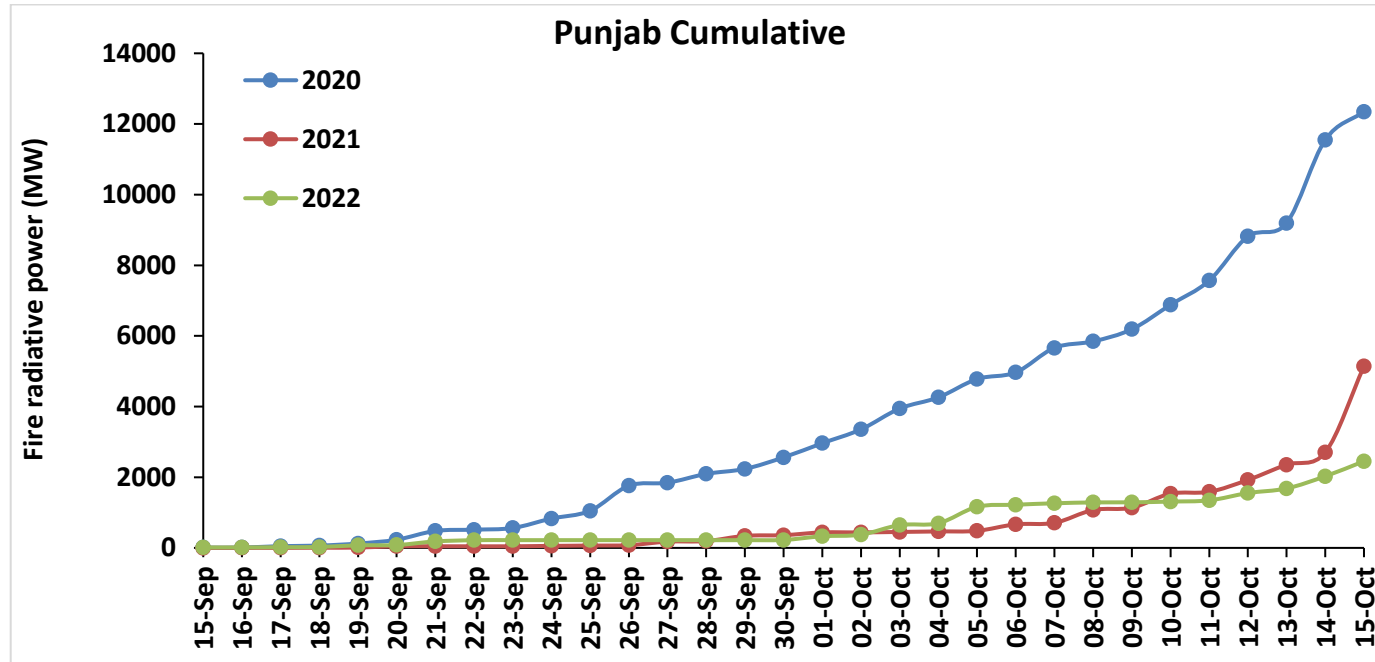
Comparison of residue burning events in current year (2022) with previous years (2020 and 2021) for the study States

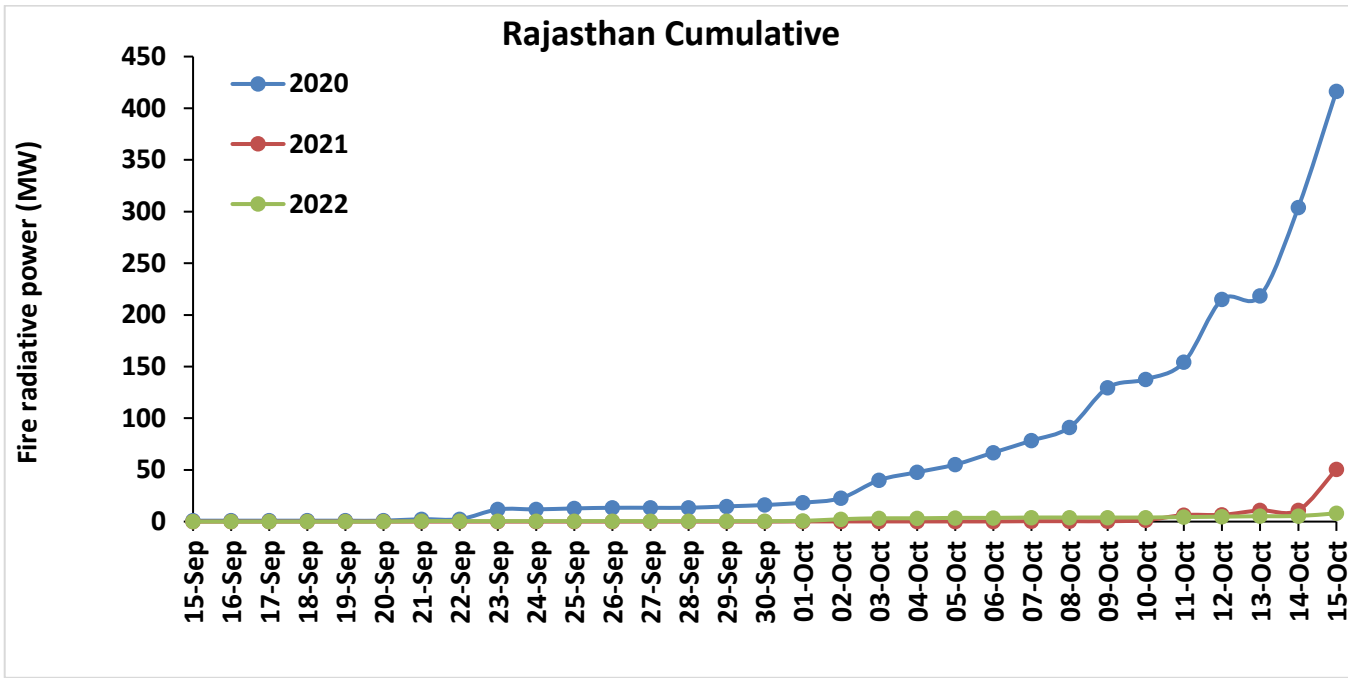
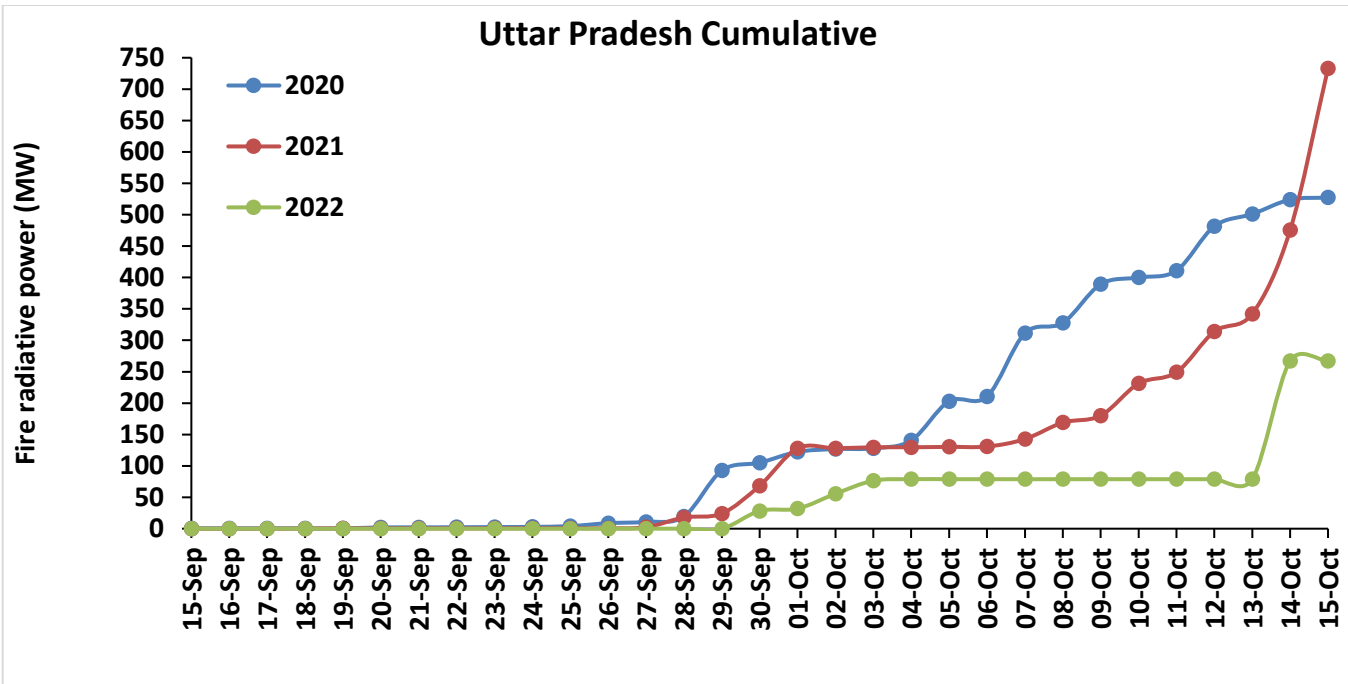


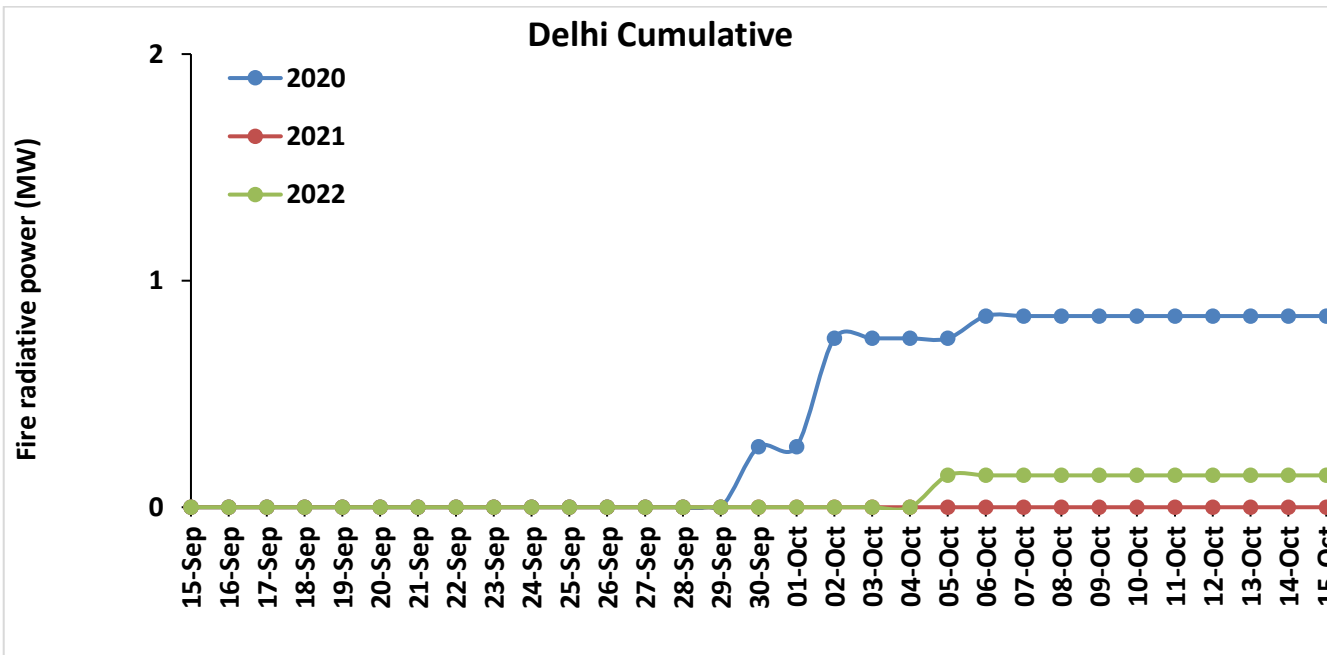
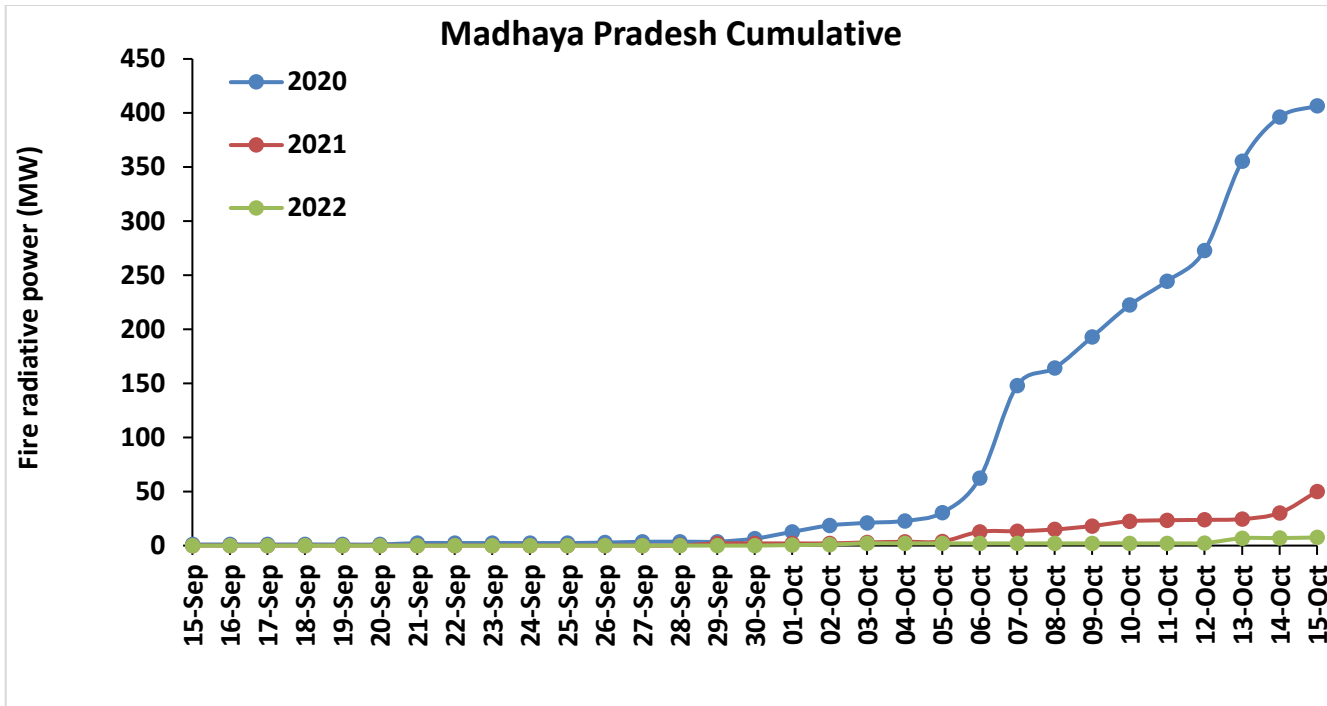




Comparison of residue burning fire power in current year (2022) with previous years (2021 and 2020) for the study States

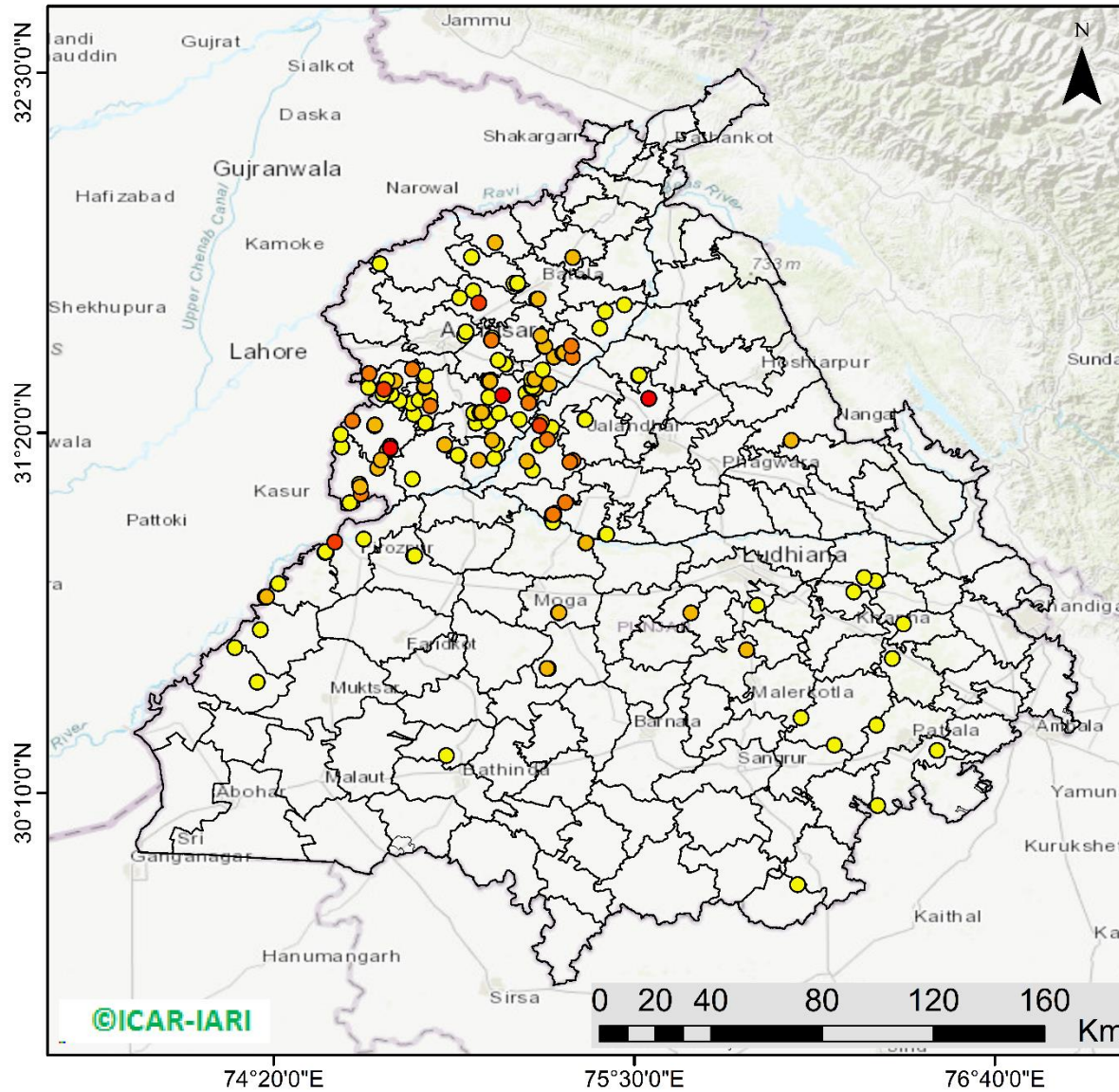






Punjab

RICE RESIDUE BURNING IN PUNJAB



169 burning events detected in Punjab during (15th Oct 2022)

Fire Intensity (W/m²)

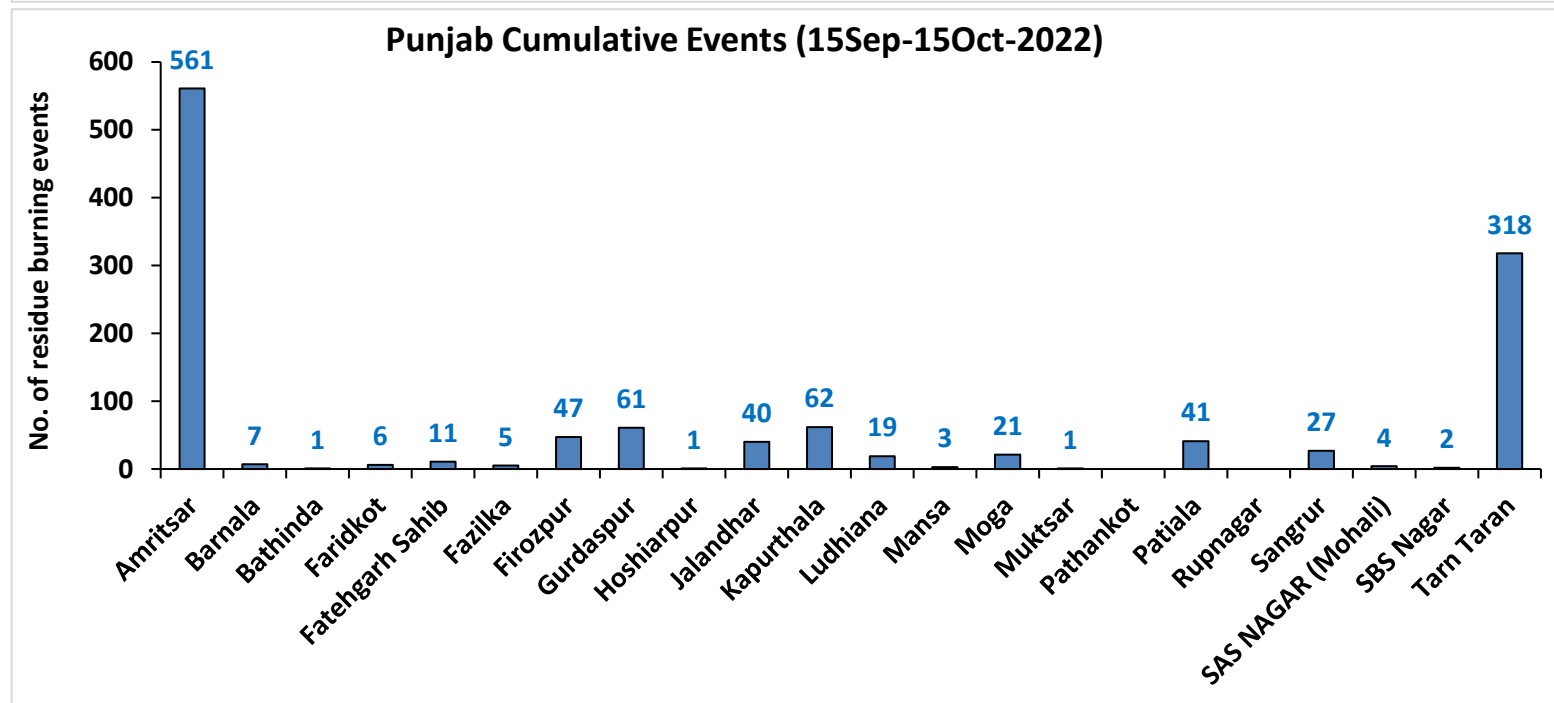
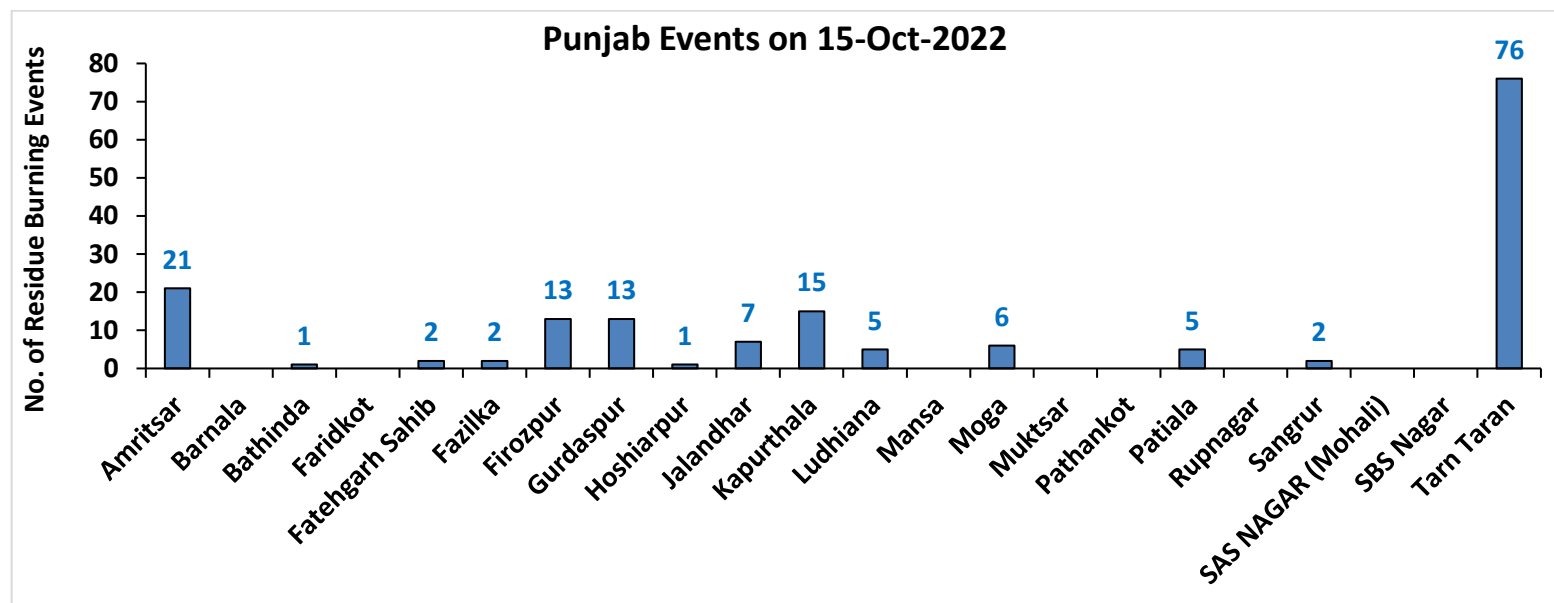
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



©ICAR-IARI

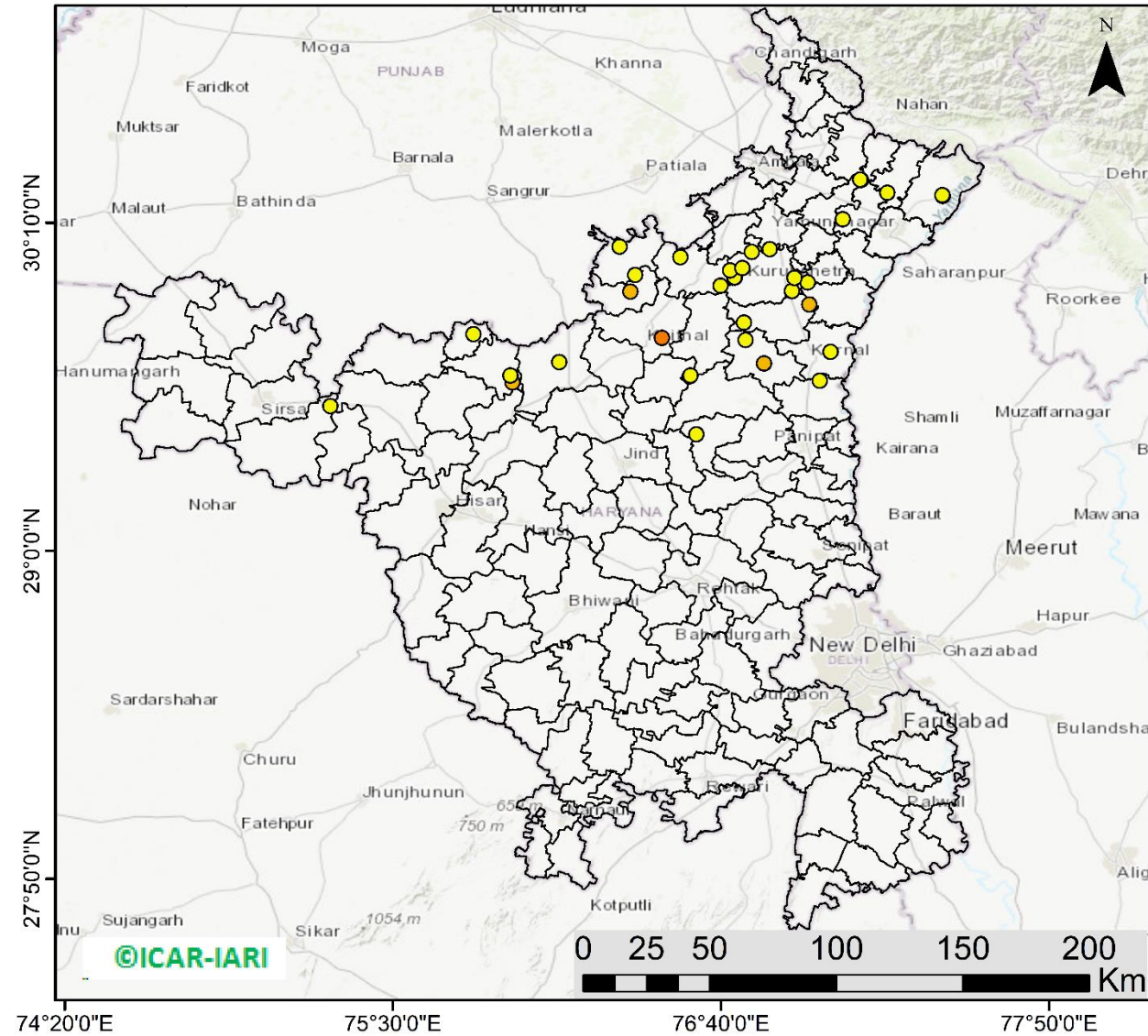
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

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



Haryana

RICE RESIDUE BURNING IN HARYANA



36 burning events detected in Haryana on (15th Oct 2022)

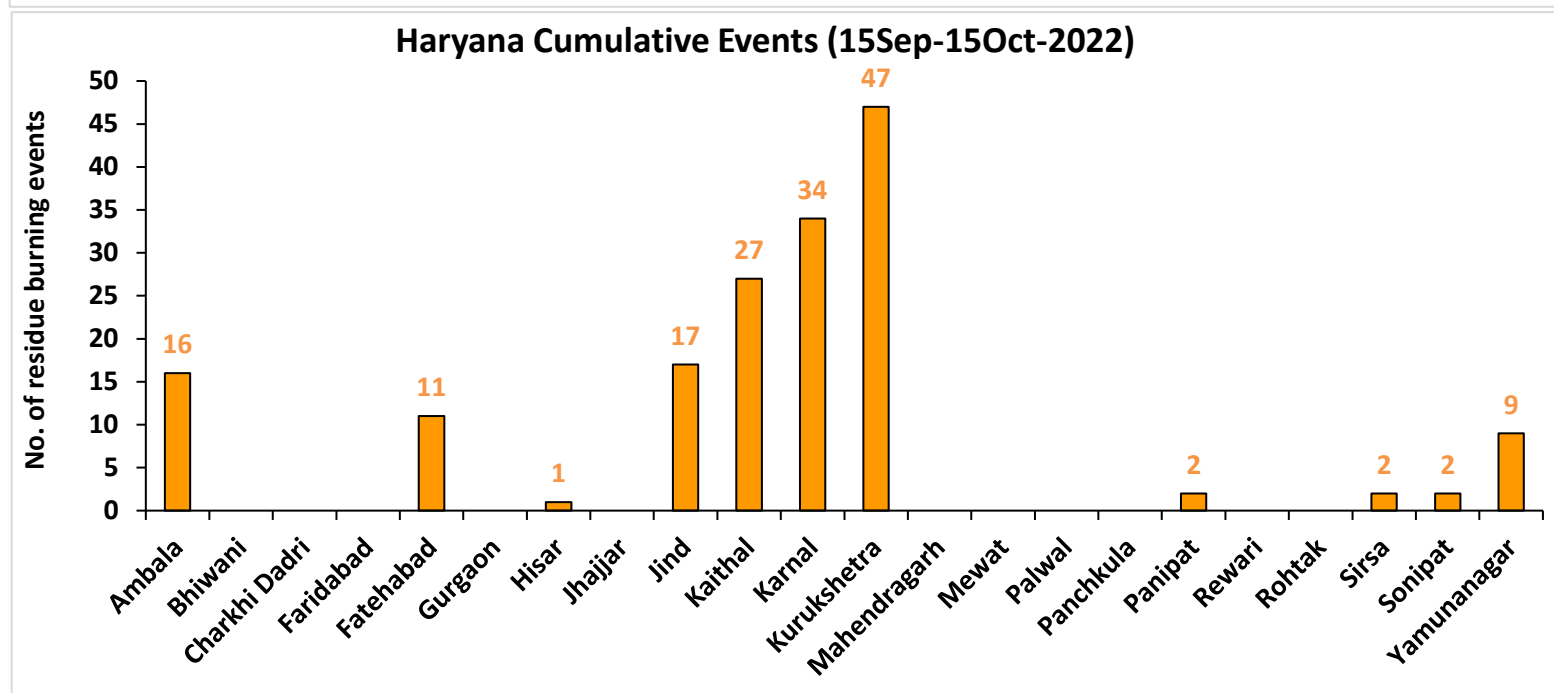
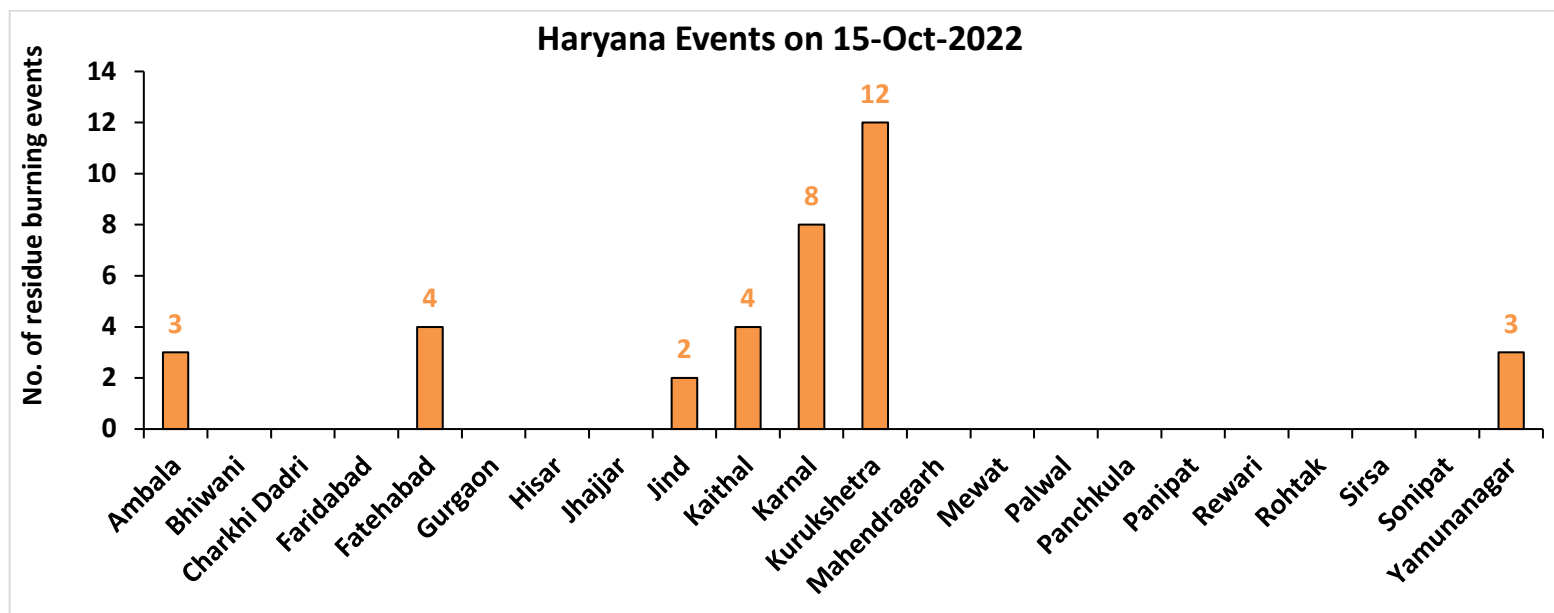
Fire Intensity (W/m²)

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



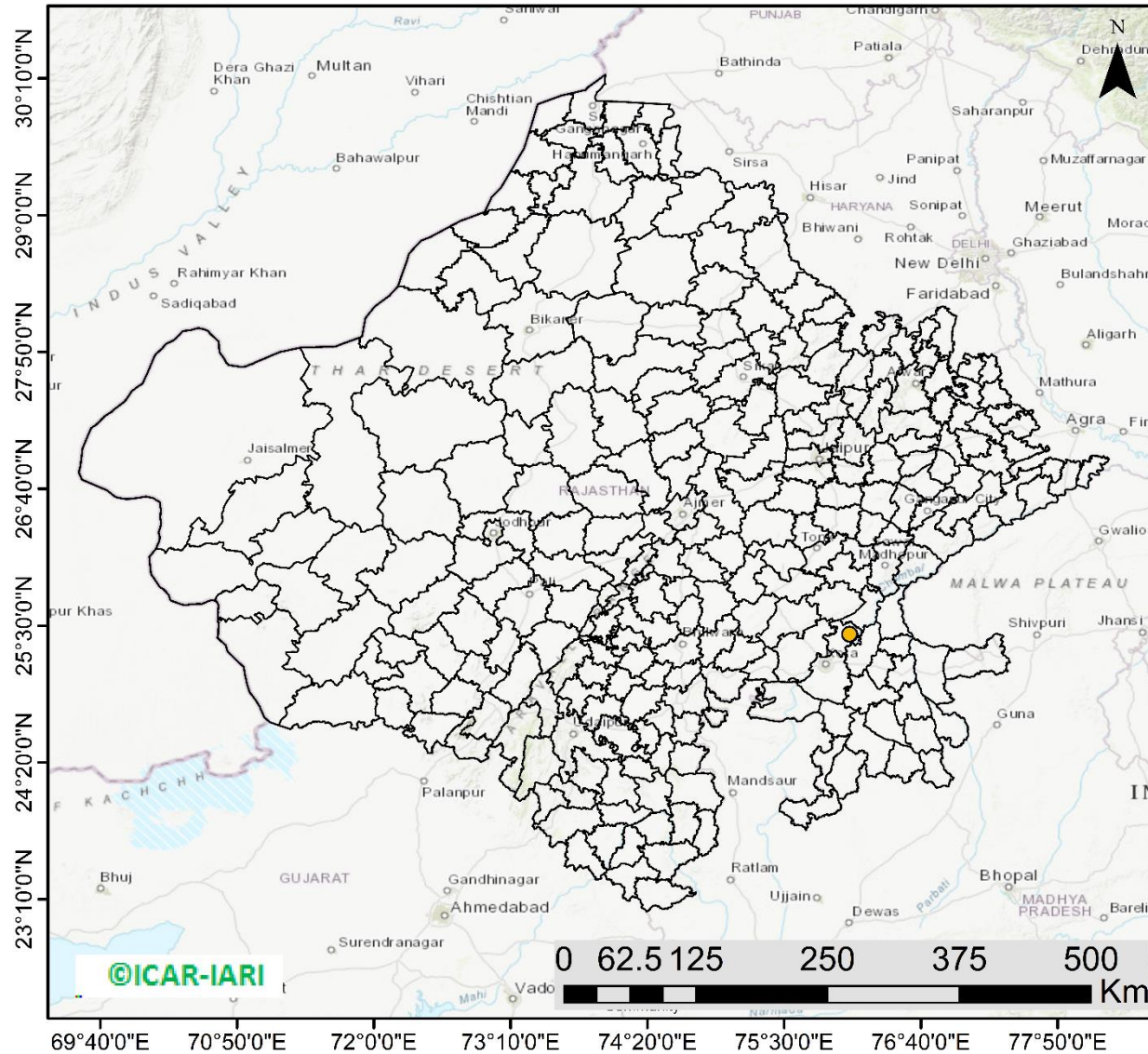
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

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



Rajasthan

RICE RESIDUE BURNING IN RAJASTHAN



02 burning events detected in Rajasthan on (15th Oct 2022)

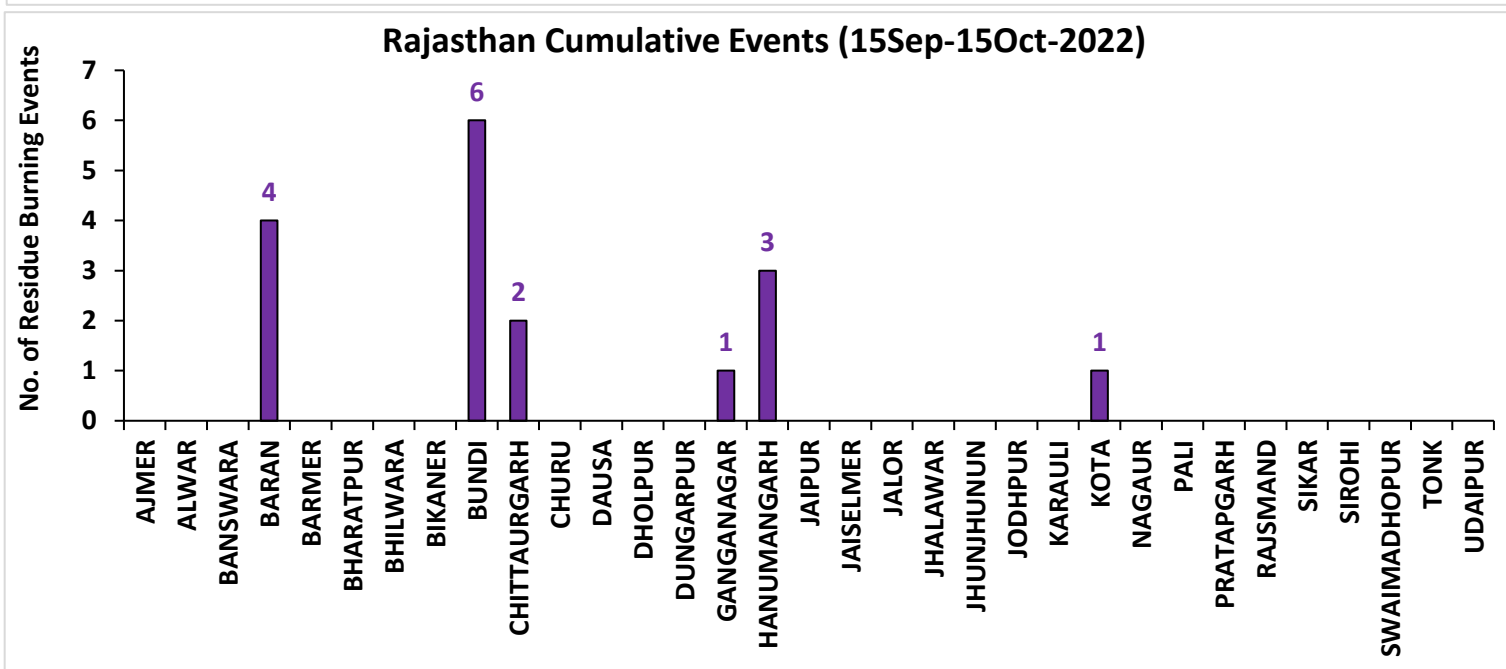
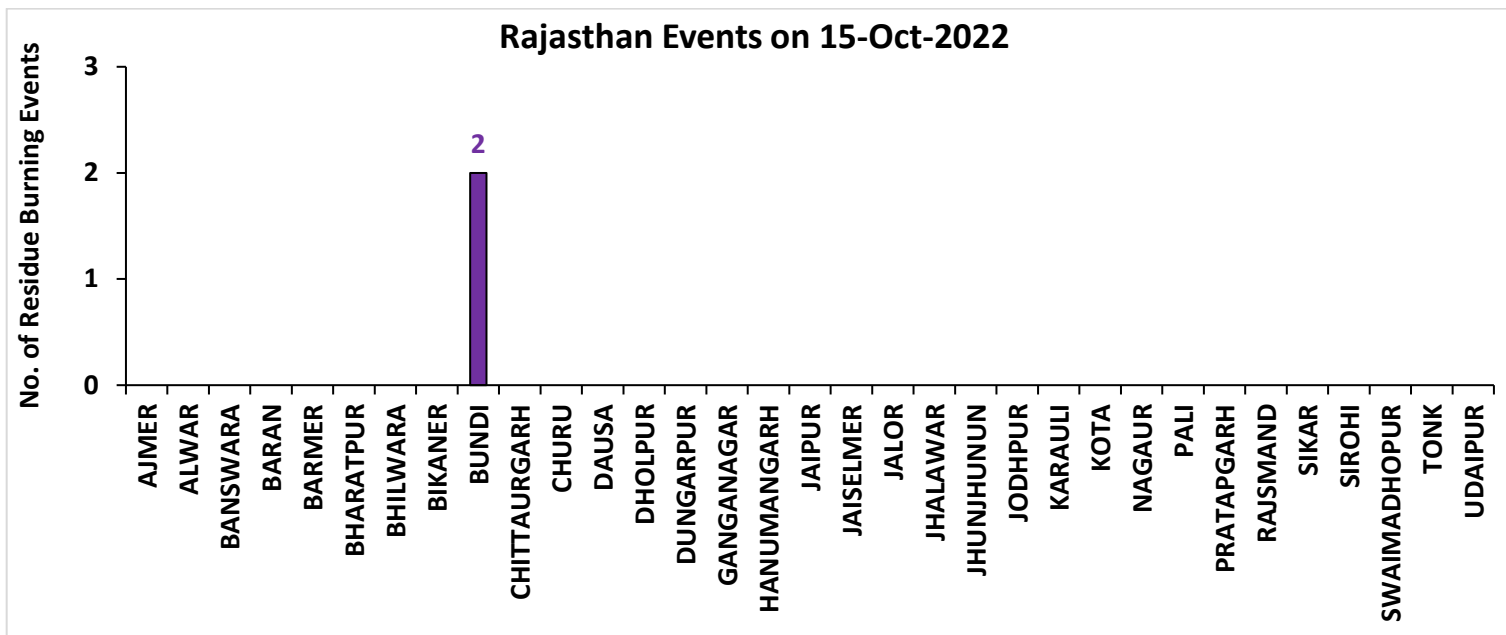
Fire Intensity (W/m²)

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



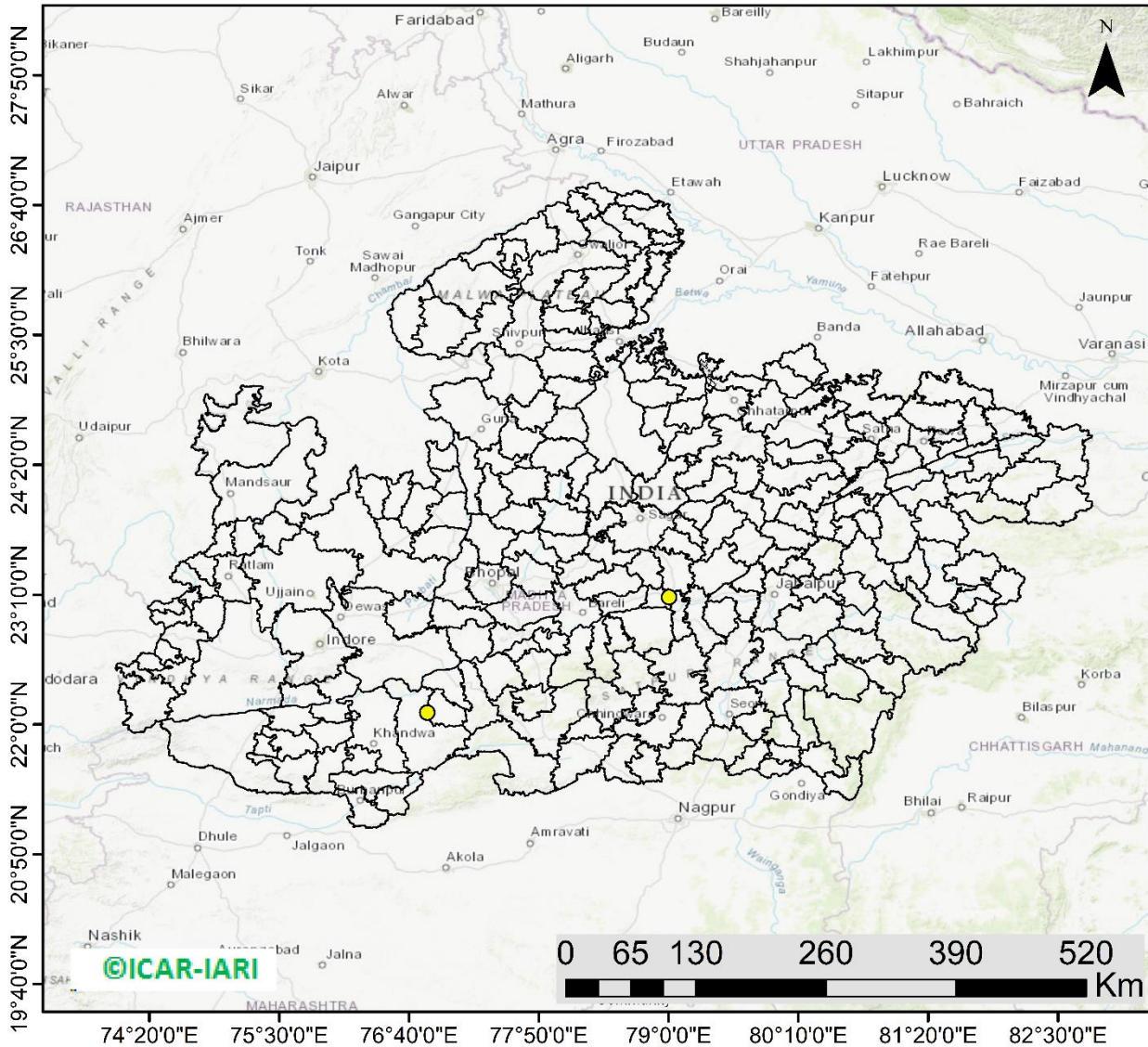
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

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



Madhya Pradesh

RICE RESIDUE BURNING IN MADHYA PRADESH



02 burning events detected in MP on (15th Oct 2022)

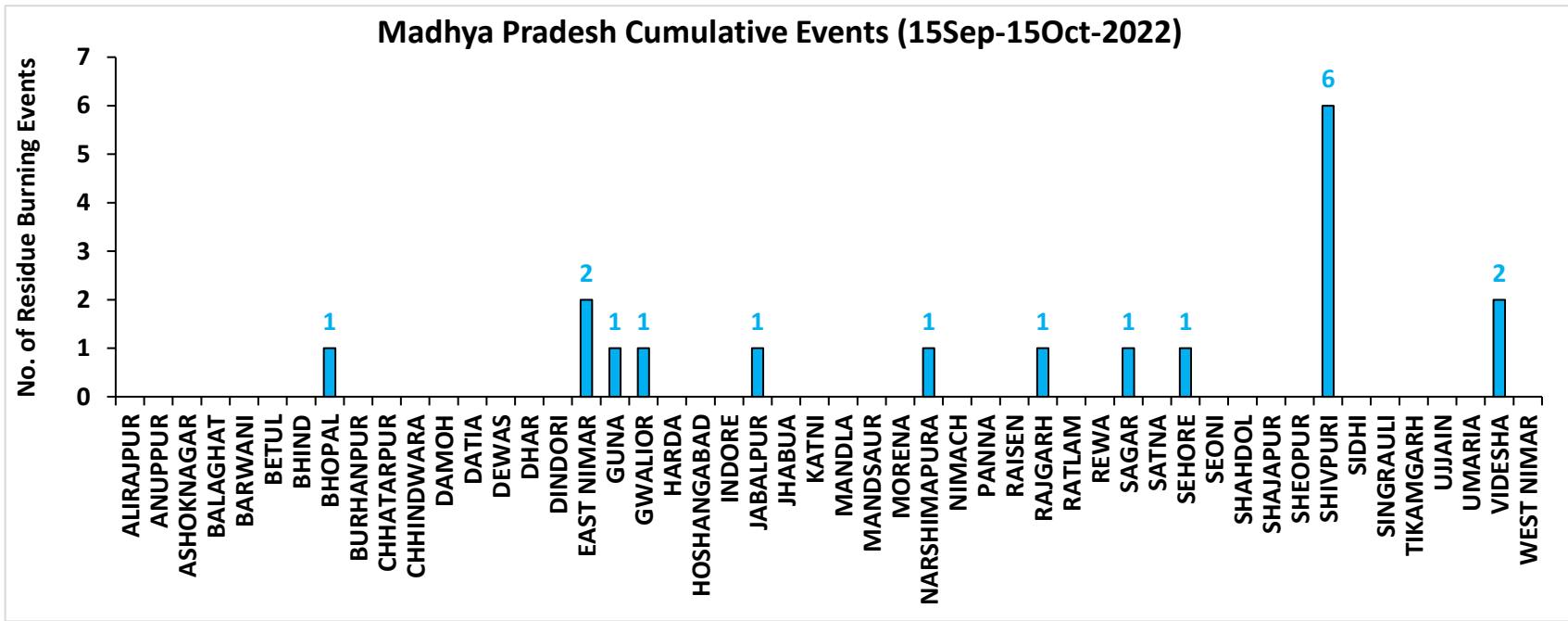
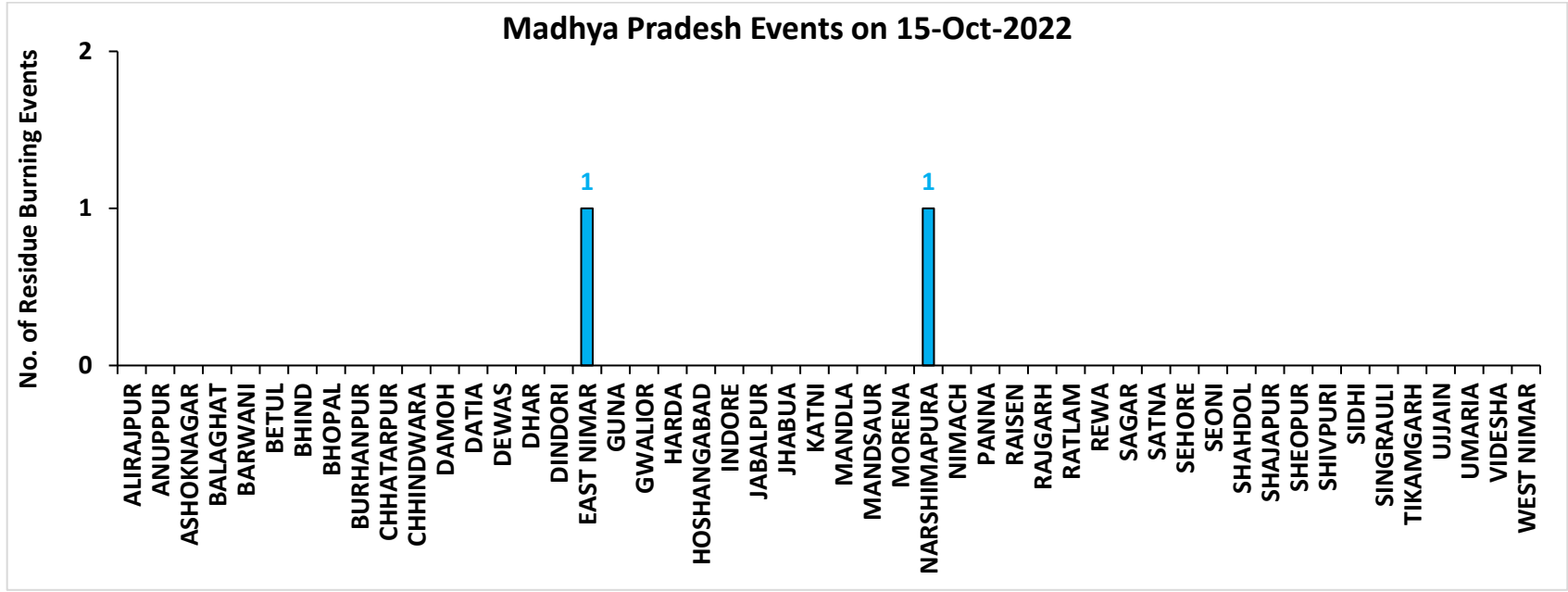
Fire Intensity (W/m²)

- 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- 15Oct -2022)



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

(a) Punjab

District	15 Sep-15 Oct 2022		
	2020	2021	2022
Amritsar	1699	532	561
Barnala	18	11	7
Bathinda	33	5	1
Faridkot	107	57	6
Fatehgarh Sahib	84	92	11
Fazilka	21	24	5
Firozpur	270	61	47
Gurdaspur	276	104	61
Hoshiarpur	28	10	1
Jalandhar	80	62	40
Kapurthala	145	74	62
Ludhiana	118	121	19
Mansa	33	1	3
Moga	37	33	21
Muktsar	16	14	1
Pathankot	0	0	0
Patiala	412	197	41
Rupnagar	12	10	0
Sangrur	107	38	27
SAS NAGAR (Mohali)	29	22	4
SBS Nagar	11	6	2
Tarn Taran	1129	472	318
Total	4665	1946	1238

(b) Haryana

District	15 Sep-15 Oct 2022		
	2020	2021	2022
AMBALA	86	39	16
BHIWANI	0	0	0
CHARKHI DADRI	0	0	0
FARIDABAD	0	1	0
FATEHABAD	41	40	11
GURGAON	0	0	0
HISAR	6	0	1
JHAJJAR	1	0	0
JIND	20	23	17
KAITHAL	115	203	27
KARNAL	214	296	34
KURUKSHETRA	151	172	47
MAHENDRAGARH	0	0	0
MEWAT	0	0	0
PALWAL	6	21	0
PANCHKULA	0	0	0
PANIPAT	7	15	2
REWARI	0	0	0
ROHTAK	0	0	0
SIRSA	7	4	2
SONIPAT	9	4	2
YAMUNANAGAR	39	32	9
Total	702	850	168

(c) Uttar Pradesh

District	15 Sep-15 Oct 2022										
	2020	2021	2022	GAUTAMBUDHNAGAR	1	7	0	MUZAFARNAGAR	2	2	0
AGRA	1	0	0	GAZIPUR	0	0	0	PILHIBHIT	5	57	2
ALIGARH	24	13	1	GHAZIABAD	1	2	1	PRATAPGARH	0	0	0
ALLAHABAD	0	1	0	GONDA	0	0	0	RAIBEARELI	1	0	0
AMBEDKARNAGAR	0	0	0	GORAKHPUR	0	0	0	RAMPUR	17	47	0
AMETHI	0	1	2	HAMIRPUR	1	0	0	SAMBHAL	6	6	4
AMROHA	1	0	0	HAPUR	3	0	0	SANTKABIRNAGAR	0	0	0
AURAIYA	16	2	4	HARDOI	6	6	0	SANTRAVIDASNAGAR	0	0	0
AZAMGARH	0	0	0	HATHRAS	0	0	0	SHAHJAHANPUR	36	146	53
BADAUN	0	1	0	JALAUN	0	0	0	SHAMLI	18	10	2
BAGHPAT	2	1	0	JAUNPUR	0	0	0	SHARANPUR	18	15	6
BAHRAICH	2	2	1	JHANSI	6	4	0	SHRAWASTI	2	0	0
BALLIA	0	0	0	KANNAUJ	3	0	0	SIDDHARTHANAGAR	0	0	0
BALRAMPUR	0	0	0	KANPUR	0	1	0	SITAPUR	9	8	0
BANDA	0	0	0	KANPUR DEHAT	3	1	0	SONBHADRA	0	0	0
BARABANKI	10	5	0	KASGANJ	1	2	0	SULTANPUR	0	0	0
BAREILLY	10	11	0	KAUSHAMBI	7	2	0	UNNAO	4	0	0
BASTI	2	1	0	KHERI	30	39	8	VARANASI	0	0	0
BIJNOR	4	2	1	KUSHINAGAR	0	0	0	Total	320	460	91
BULANDSAHAR	6	2	2	LALITPUR	0	1	2				
CHANDAULI	0	0	0	LUCKNOW	2	0	0				
CHITRAKOOT	0	0	0	MAHARAJGANJ	0	0	0				
DEORIA	0	0	0	MAHOBA	1	0	0				
ETAH	4	6	0	MAINPURI	4	6	0				
ETAWAH	2	6	0	MATHURA	14	24	0				
FAIZABAD	1	0	0	MAU	0	0	0				
FARRUKHABAD	0	0	0	MEERUT	9	2	0				
FATEHPUR	14	6	0	MIRZAPUR	5	5	2				
FIROZABAD	4	4	0	MORADABAD	2	3	0				

(d) Delhi

District	15 Sep-15 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-15 Oct 2022		
	2020	2021	2022
AJMER	0	0	0
ALWAR	1	0	0
BANSWARA	0	0	0
BARAN	81	0	4
BARMER	2	0	0
BHARATPUR	0	0	0
BHILWARA	2	0	0
BIKANER	1	0	0
BUNDI	4	0	6
CHITTAURGARH	0	2	2
CHURU	0	0	0
DAUSA	0	0	0
DHOLPUR	0	0	0
DUNGARPUR	0	0	0
GANGANAGAR	2	0	1
HANUMANGARH	74	22	3
JAIPUR	0	0	0
JAISELMER	2	0	0
JALOR	0	0	0
JHALAWAR	1	0	0
JHUNJHUNUN	1	0	0
JODHPUR	1	0	0
KARAULI	1	0	0
KOTA	23	1	1
NAGAUR	0	0	0
PALI	1	0	0
PRATAPGARH	0	0	0
RAJSMAND	0	0	0
SIKAR	0	0	0
SIROHI	1	0	0
SWAIMADHOPUR	3	0	0
TONK	1	0	0
UDAIPUR	0	0	0
Total	202	25	17

(f) Madhya Pradesh

District	15 Sep-15 Oct 2022						
	2020	2021	2022				
				PANNA	2	0	0
ALIRAJPUR	0	0	0	RAISEN	10	1	0
ANUPPUR	0	0	0	RAJGARH	7	1	2
ASHOKNAGAR	9	0	0	RATLAM	0	0	0
BALAGHAT	0	0	0	REWA	3	0	0
BARWANI	0	0	0	SAGAR	13	5	1
BETUL	0	0	0	SATNA	3	4	0
BHIND	2	1	0	SEHORE	5	3	1
BHOPAL	6	5	1	SEONI	9	4	0
BURHANPUR	0	0	0	SHAHDOL	0	0	0
CHHATARPUR	4	0	0	SHAJAPUR	5	0	0
CHHINDWARA	0	3	0	SHEOPUR	6	0	0
DAMOH	15	4	0	SHIVPURI	5	0	6
DATIA	31	7	0	SIDHI	0	0	0
DEWAS	3	0	0	SINGRAULI	0	0	0
DHAR	19	0	0	TIKAMGARH	1	0	0
DINDORI	0	0	0	UJJAIN	5	0	0
EAST NIMAR	2	1	2	UMARIA	0	0	0
GUNA	15	1	1	VIDESHA	51	8	2
GWALIOR	21	0	1	WEST NIMAR	2	0	0
HARDA	8	8	0	Total	298	70	18
HOSHANGABAD	9	4	0				
INDORE	2	0	0				
JABALPUR	6	3	0				
JHABUA	0	0	0				
KATNI	0	0	0				
MANDLA	0	0	0				
MANDSAUR	3	0	0				
MORENA	14	5	0				
NARSHIMAPURA	2	2	1				
NIMACH	0	0	0				

State-wise and date-wise number of paddy residue burning events detected in 2020, 2021 and 2022
(Period: 15 September - 15 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
08-Oct	95	108	19	29	27	0	25	11	0	0	0	0	11	0	0	17	2	0

09-Oct	121	114	3	20	39	1	15	20	0	0	0	0	12	0	0	15	4	0
10-Oct	232	150	4	33	95	2	9	54	0	0	0	0	14	1	0	18	10	0
11-Oct	377	64	45	90	51	0	23	28	0	0	0	0	21	7	1	32	2	0
12-Oct	388	97	104	69	51	4	46	23	0	0	0	0	24	1	2	44	1	1
13-Oct	266	132	120	47	91	15	36	42	0	0	0	0	7	5	2	21	2	7
14-Oct	605	229	82	69	98	30	9	68	11	0	0	0	16	1	1	15	11	1
15-Oct	449	660	169	106	363	36	15	149	0	0	0	0	9	8	2	8	27	2
Total	4665	1946	1238	702	850	168	320	460	91	3	0	2	202	25	17	298	70	18

Details of residue burning events in Punjab on 15-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	AMRITSAR	AJNALA	S-NPP	31.88040	74.67660	14:19:36	D	3.60
2	AMRITSAR	JANDIALA GURU	S-NPP	31.55470	75.08370	12:40:01	D	4.90
3	AMRITSAR	JANDIALA GURU	S-NPP	31.55550	75.08170	12:40:01	D	3.60
4	AMRITSAR	JANDIALA GURU	S-NPP	31.56780	75.05990	14:19:36	D	3.70
5	AMRITSAR	MAJITHA	S-NPP	31.76990	74.93470	14:19:36	D	3.80
6	AMRITSAR	MAJITHA	S-NPP	31.79260	74.97900	12:40:01	D	2.70
7	AMRITSAR	MAJITHA	AQUA	31.75400	74.99700	14:10:19	D	16.10
8	AMRITSAR	RAYYA	S-NPP	31.53720	75.20370	12:40:01	D	2.70
9	AMRITSAR	RAYYA	S-NPP	31.57810	75.24030	14:19:36	D	8.40
10	AMRITSAR	RAYYA	S-NPP	31.59120	75.26900	12:40:01	D	8.00
11	AMRITSAR	RAYYA	S-NPP	31.59210	75.27240	12:40:01	D	11.00
12	AMRITSAR	RAYYA	S-NPP	31.59240	75.27370	12:40:01	D	8.10
13	AMRITSAR	RAYYA	S-NPP	31.61310	75.20740	14:19:36	D	3.40
14	AMRITSAR	RAYYA	S-NPP	31.61330	75.21110	14:19:36	D	5.30
15	AMRITSAR	RAYYA	AQUA	31.57800	75.30000	14:10:19	D	11.00
16	AMRITSAR	RAYYA	AQUA	31.61400	75.29600	14:10:19	D	14.50
17	AMRITSAR	TARSIKKA	S-NPP	31.64070	75.04050	14:19:36	D	2.80
18	AMRITSAR	TARSIKKA	S-NPP	31.64690	75.19790	12:40:01	D	5.80
19	AMRITSAR	TARSIKKA	AQUA	31.63300	75.03800	14:10:19	D	10.80
20	AMRITSAR	VERKA	S-NPP	31.64780	74.95120	14:19:36	D	4.30

21	AMRITSAR	VERKA	S-NPP	31.66020	74.95560	14:19:36	D	3.10
22	BATHINDA	GONIANA MANDI	S-NPP	30.28750	74.89190	12:40:01	D	5.00
23	FATEHGARH SAHIB	BASSI PATHANAN	S-NPP	30.71390	76.37120	12:40:01	D	2.70
24	FATEHGARH SAHIB	SIRHIND	S-NPP	30.60230	76.33500	14:19:36	D	3.10
25	FAZILKA	JALALABAD	S-NPP	30.52540	74.27980	14:19:36	D	4.60
26	FAZILKA	JALALABAD	S-NPP	30.63740	74.20790	14:19:36	D	2.50
27	FIROZPUR	FIROZPUR	S-NPP	30.94620	74.49900	14:19:36	D	3.00
28	FIROZPUR	FIROZPUR	S-NPP	30.94650	74.50380	14:19:36	D	3.00
29	FIROZPUR	FIROZPUR	S-NPP	30.94780	74.50120	14:19:36	D	4.00
30	FIROZPUR	FIROZPUR	S-NPP	30.98870	74.62470	12:40:01	D	3.30
31	FIROZPUR	FIROZPUR	AQUA	30.97900	74.53100	14:10:19	D	15.80
32	FIROZPUR	GHALL KHURD	S-NPP	30.93460	74.78660	12:40:01	D	5.10
33	FIROZPUR	GHALL KHURD	S-NPP	30.93540	74.78970	12:40:01	D	3.80
34	FIROZPUR	GURUHAR SAHAI	S-NPP	30.69480	74.29020	14:19:36	D	2.60
35	FIROZPUR	GURUHAR SAHAI	S-NPP	30.69530	74.29040	14:19:36	D	2.70
36	FIROZPUR	MAMDOT	S-NPP	30.80080	74.30960	14:19:36	D	7.40
37	FIROZPUR	MAMDOT	S-NPP	30.80120	74.30590	14:19:36	D	3.80
38	FIROZPUR	MAMDOT	S-NPP	30.80150	74.31050	14:19:36	D	5.80
39	FIROZPUR	MAMDOT	S-NPP	30.84450	74.34880	14:19:36	D	2.10
40	GURDASPUR	BATALA	S-NPP	31.76570	75.18380	14:19:36	D	9.10
41	GURDASPUR	BATALA	S-NPP	31.76590	75.18920	14:19:36	D	9.10
42	GURDASPUR	DERA BABA NANAK	S-NPP	31.94890	75.04960	14:19:36	D	6.10
43	GURDASPUR	DHARIWAL	S-NPP	31.90040	75.30160	14:19:36	D	5.40
44	GURDASPUR	DHARIWAL	S-NPP	31.90090	75.30150	14:19:36	D	6.20
45	GURDASPUR	FATEHGARH CHURIAN	S-NPP	31.81670	75.11070	14:19:36	D	3.50
46	GURDASPUR	FATEHGARH CHURIAN	S-NPP	31.81730	75.12140	14:19:36	D	5.20
47	GURDASPUR	FATEHGARH CHURIAN	S-NPP	31.81760	75.12270	14:19:36	D	4.70
48	GURDASPUR	FATEHGARH CHURIAN	S-NPP	31.90080	74.97390	14:19:36	D	6.60
49	GURDASPUR	FATEHGARH CHURIAN	S-NPP	31.90220	74.97350	14:19:36	D	4.70
50	GURDASPUR	SRI HARGOBINDPUR	S-NPP	31.67200	75.38880	14:19:36	D	2.40
51	GURDASPUR	SRI HARGOBINDPUR	S-NPP	31.72550	75.40610	12:40:01	D	2.80
52	GURDASPUR	SRI HARGOBINDPUR	S-NPP	31.74710	75.46770	12:40:01	D	1.60
53	HOSHIARPUR	GARH SHANKAR	S-NPP	31.30820	76.00830	14:19:36	D	6.20

54	JALANDHAR	JALANDHAR WEST	AQUA	31.44400	75.54700	14:10:19	D	23.90
55	JALANDHAR	LOHIAN	S-NPP	31.04360	75.23660	14:19:36	D	4.50
56	JALANDHAR	MEHATPUR	S-NPP	31.00420	75.41110	14:19:36	D	3.10
57	JALANDHAR	SHAHKOT	S-NPP	31.06800	75.23500	14:19:36	D	6.20
58	JALANDHAR	SHAHKOT	S-NPP	31.06830	75.24030	14:19:36	D	6.20
59	JALANDHAR	SHAHKOT	S-NPP	31.06840	75.23740	14:19:36	D	14.00
60	JALANDHAR	SHAHKOT	S-NPP	31.10730	75.27740	14:19:36	D	12.20
61	KAPURTHALA	KAPURTHALA	S-NPP	31.37600	75.34020	12:40:01	D	2.50
62	KAPURTHALA	KAPURTHALA	S-NPP	31.37600	75.34150	12:40:01	D	4.70
63	KAPURTHALA	NADALA	S-NPP	31.51830	75.51390	14:19:36	D	3.90
64	KAPURTHALA	NADALA	S-NPP	31.51970	75.51610	14:19:36	D	3.60
65	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.21150	75.17090	14:19:36	D	2.00
66	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.24100	75.15300	14:19:36	D	5.30
67	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.24320	75.30200	14:19:36	D	10.40
68	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.29210	75.19180	14:19:36	D	5.30
69	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.29290	75.19410	14:19:36	D	4.60
70	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.33160	75.22880	14:19:36	D	4.10
71	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.35020	75.23280	14:19:36	D	4.80
72	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.36670	75.19970	14:19:36	D	6.40
73	KAPURTHALA	SULTANPUR LODHI	AQUA	31.23800	75.29200	14:10:19	D	13.20
74	KAPURTHALA	SULTANPUR LODHI	AQUA	31.31100	75.21900	14:10:19	D	13.50
75	KAPURTHALA	SULTANPUR LODHI	AQUA	31.35600	75.19400	14:10:19	D	15.10
76	LUDHIANA	DEHLON	S-NPP	30.77450	75.89780	14:19:36	D	4.30
77	LUDHIANA	MACHHIWARA	S-NPP	30.85330	76.28090	14:19:36	D	3.50
78	LUDHIANA	MACHHIWARA	S-NPP	30.86430	76.24380	14:19:36	D	2.70
79	LUDHIANA	SAMRALA	S-NPP	30.81760	76.21020	14:19:36	D	2.00
80	LUDHIANA	SUDHAR	S-NPP	30.75020	75.68360	14:19:36	D	5.30
81	MOGA	KOT ISE KHAN AT DHARAMKOT	S-NPP	30.97590	75.34280	14:19:36	D	5.10
82	MOGA	KOT ISE KHAN AT DHARAMKOT	S-NPP	30.97680	75.34420	14:19:36	D	7.20
83	MOGA	MOGA-1	S-NPP	30.75030	75.25480	14:19:36	D	5.80
84	MOGA	MOGA-1	S-NPP	30.75070	75.25630	14:19:36	D	7.80
85	MOGA	NIHAL SINGH	S-NPP	30.56970	75.22210	14:19:36	D	6.30
86	MOGA	NIHAL SINGH	S-NPP	30.57020	75.21800	14:19:36	D	7.20

87	PATIALA	NABHA	S-NPP	30.32140	76.14740	12:40:01	D	2.70
88	PATIALA	NABHA	S-NPP	30.41000	76.04000	14:19:36	D	3.50
89	PATIALA	PATIALA	S-NPP	30.38590	76.28400	12:40:01	D	2.20
90	PATIALA	SANAUR	S-NPP	30.12610	76.28750	14:19:36	D	4.20
91	PATIALA	SANAUR	S-NPP	30.30430	76.47970	14:19:36	D	4.80
92	SANGRUR	ANDANA	S-NPP	29.86970	76.02850	12:40:01	D	3.90
93	SANGRUR	MALERKOTLA-2	S-NPP	30.63020	75.86340	14:19:36	D	7.40
94	TARN TARAN	BHIKHIWIND	S-NPP	31.27380	74.70030	14:19:36	D	8.50
95	TARN TARAN	BHIKHIWIND	S-NPP	31.28410	74.71120	14:19:36	D	6.80
96	TARN TARAN	BHIKHIWIND	S-NPP	31.29010	74.71070	14:19:36	D	4.50
97	TARN TARAN	BHIKHIWIND	S-NPP	31.35580	74.65950	14:19:36	D	6.20
98	TARN TARAN	BHIKHIWIND	S-NPP	31.35850	74.66100	14:19:36	D	6.20
99	TARN TARAN	BHIKHIWIND	AQUA	31.24500	74.68100	14:10:19	D	9.00
100	TARN TARAN	BHIKHIWIND	AQUA	31.28300	74.71100	14:10:19	D	29.80
101	TARN TARAN	BHIKHIWIND	AQUA	31.37200	74.58800	14:10:19	D	11.60
102	TARN TARAN	CHOHLA SAHIB	S-NPP	31.24400	74.99600	14:19:36	D	5.20
103	TARN TARAN	CHOHLA SAHIB	S-NPP	31.25000	75.04760	12:40:01	D	3.20
104	TARN TARAN	CHOHLA SAHIB	S-NPP	31.25840	74.93320	14:19:36	D	4.60
105	TARN TARAN	CHOHLA SAHIB	S-NPP	31.26050	74.93000	14:19:36	D	3.80
106	TARN TARAN	CHOHLA SAHIB	S-NPP	31.29600	75.05460	14:19:36	D	4.30
107	TARN TARAN	CHOHLA SAHIB	S-NPP	31.30890	75.04010	14:19:36	D	6.00
108	TARN TARAN	GANDIWIND TATLA	S-NPP	31.43770	74.74030	12:40:01	D	3.00
109	TARN TARAN	GANDIWIND TATLA	S-NPP	31.45790	74.71380	14:19:36	D	3.80
110	TARN TARAN	GANDIWIND TATLA	S-NPP	31.45860	74.68660	14:19:36	D	3.20
111	TARN TARAN	GANDIWIND TATLA	S-NPP	31.47760	74.69830	12:40:01	D	9.00
112	TARN TARAN	GANDIWIND TATLA	S-NPP	31.47950	74.64050	14:19:36	D	2.80
113	TARN TARAN	GANDIWIND TATLA	S-NPP	31.48060	74.69210	14:19:36	D	17.10
114	TARN TARAN	GANDIWIND TATLA	S-NPP	31.48260	74.68990	14:19:36	D	9.20
115	TARN TARAN	GANDIWIND TATLA	S-NPP	31.48290	74.69490	14:19:36	D	9.20
116	TARN TARAN	GANDIWIND TATLA	S-NPP	31.48350	74.69630	12:40:01	D	9.00
117	TARN TARAN	GANDIWIND TATLA	S-NPP	31.50040	74.72570	14:19:36	D	6.60
118	TARN TARAN	GANDIWIND TATLA	S-NPP	31.50370	74.70020	12:40:01	D	3.80
119	TARN TARAN	GANDIWIND TATLA	S-NPP	31.51810	74.82540	14:19:36	D	3.60

120	TARN TARAN	GANDIWIND TATLA	AQUA	31.47400	74.69000	14:10:19	D	19.20
121	TARN TARAN	GANDIWIND TATLA	AQUA	31.52500	74.64200	14:10:19	D	12.50
122	TARN TARAN	GANDIWIND TATLA	AQUA	31.53900	74.78200	14:10:19	D	11.30
123	TARN TARAN	KHADUR SAHIB	S-NPP	31.37590	75.12790	12:40:01	D	3.40
124	TARN TARAN	KHADUR SAHIB	S-NPP	31.39640	75.06230	12:40:01	D	2.20
125	TARN TARAN	KHADUR SAHIB	S-NPP	31.44780	75.02920	12:40:01	D	3.10
126	TARN TARAN	KHADUR SAHIB	S-NPP	31.45060	75.16580	14:19:36	D	8.80
127	TARN TARAN	KHADUR SAHIB	S-NPP	31.46190	75.14900	14:19:36	D	2.70
128	TARN TARAN	KHADUR SAHIB	S-NPP	31.47590	75.18010	14:19:36	D	4.10
129	TARN TARAN	KHADUR SAHIB	S-NPP	31.47690	75.18290	14:19:36	D	5.10
130	TARN TARAN	KHADUR SAHIB	S-NPP	31.48140	75.16910	14:19:36	D	6.40
131	TARN TARAN	KHADUR SAHIB	S-NPP	31.48210	75.16660	14:19:36	D	4.40
132	TARN TARAN	KHADUR SAHIB	S-NPP	31.48240	75.17190	14:19:36	D	4.40
133	TARN TARAN	KHADUR SAHIB	S-NPP	31.49060	75.22190	14:19:36	D	4.70
134	TARN TARAN	KHADUR SAHIB	S-NPP	31.49130	75.22470	14:19:36	D	5.90
135	TARN TARAN	KHADUR SAHIB	S-NPP	31.49760	75.03070	14:19:36	D	9.10
136	TARN TARAN	KHADUR SAHIB	S-NPP	31.49920	75.02800	14:19:36	D	6.30
137	TARN TARAN	KHADUR SAHIB	S-NPP	31.49950	75.03320	14:19:36	D	6.30
138	TARN TARAN	KHADUR SAHIB	S-NPP	31.50580	75.16740	14:19:36	D	3.40
139	TARN TARAN	KHADUR SAHIB	S-NPP	31.50640	75.17800	14:19:36	D	6.00
140	TARN TARAN	KHADUR SAHIB	AQUA	31.43000	75.15900	14:10:19	D	11.80
141	TARN TARAN	KHADUR SAHIB	AQUA	31.45400	75.07400	14:10:19	D	45.70
142	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.36430	74.98760	12:40:01	D	3.00
143	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.36900	75.03060	14:19:36	D	5.40
144	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.37010	75.02930	14:19:36	D	3.90
145	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.39640	74.98210	14:19:36	D	5.50
146	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.39760	75.00270	14:19:36	D	7.70
147	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.39780	74.98060	14:19:36	D	3.20
148	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.39800	75.00790	14:19:36	D	10.40
149	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.39890	75.00120	14:19:36	D	6.60
150	TARN TARAN	NAUSHERA PANNUAN	S-NPP	31.39920	75.00640	14:19:36	D	6.60
151	TARN TARAN	PATTI	S-NPP	31.18340	74.78180	14:19:36	D	3.50
152	TARN TARAN	PATTI	S-NPP	31.29420	74.88660	14:19:36	D	6.80

153	TARN TARAN	TARN TARAN	S-NPP	31.36270	74.82580	14:19:36	D	5.70
154	TARN TARAN	TARN TARAN	S-NPP	31.36500	74.82410	14:19:36	D	2.80
155	TARN TARAN	TARN TARAN	S-NPP	31.39290	74.78670	14:19:36	D	4.20
156	TARN TARAN	TARN TARAN	S-NPP	31.42830	74.77900	14:19:36	D	2.20
157	TARN TARAN	TARN TARAN	S-NPP	31.43190	74.83950	14:19:36	D	5.70
158	TARN TARAN	TARN TARAN	S-NPP	31.43910	74.80420	12:40:01	D	3.50
159	TARN TARAN	TARN TARAN	S-NPP	31.44830	74.83950	12:40:01	D	3.20
160	TARN TARAN	TARN TARAN	S-NPP	31.47880	74.82090	14:19:36	D	5.10
161	TARN TARAN	TARN TARAN	S-NPP	31.48190	74.82300	14:19:36	D	5.30
162	TARN TARAN	TARN TARAN	AQUA	31.42000	74.84000	14:10:19	D	10.80
163	TARN TARAN	VALTOHA	S-NPP	31.10650	74.57990	12:40:01	D	3.20
164	TARN TARAN	VALTOHA	S-NPP	31.16650	74.61050	12:40:01	D	2.50
165	TARN TARAN	VALTOHA	S-NPP	31.21840	74.66980	14:19:36	D	6.50
166	TARN TARAN	VALTOHA	S-NPP	31.28670	74.55360	14:19:36	D	5.00
167	TARN TARAN	VALTOHA	S-NPP	31.32780	74.55040	14:19:36	D	2.40
168	TARN TARAN	VALTOHA	AQUA	31.13500	74.61600	14:10:19	D	13.90
169	TARN TARAN	VALTOHA	AQUA	31.15800	74.61300	14:10:19	D	9.90

Details of residue burning events in Haryana on 15-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	AMBALA	BARARA	S-NPP	30.17880	77.10010	14:19:36	D	2.80
2	AMBALA	BARARA	S-NPP	30.31850	77.16490	12:40:01	D	2.90
3	AMBALA	BARARA	S-NPP	30.31980	77.16240	12:40:01	D	3.20
4	FATEHABAD	FATEHABAD	S-NPP	29.51440	75.27780	12:40:01	D	2.50
5	FATEHABAD	JAKHAL	S-NPP	29.77010	75.78670	14:19:36	D	3.10
6	FATEHABAD	TOHANA	S-NPP	29.59830	75.92560	14:19:36	D	5.40
7	FATEHABAD	TOHANA	S-NPP	29.62300	75.91830	14:19:36	D	2.70
8	JIND	NARWANA	S-NPP	29.67100	76.09170	12:40:01	D	4.00
9	JIND	SAFIDON	S-NPP	29.41390	76.57970	12:40:01	D	3.90
10	KAITHAL	GUHLA	S-NPP	30.08140	76.30650	12:40:01	D	3.20
11	KAITHAL	KAITHAL	AQUA	29.75700	76.45700	14:10:19	D	13.80
12	KAITHAL	SIWAN	S-NPP	29.92150	76.34510	14:19:36	D	5.80
13	KAITHAL	SIWAN	S-NPP	29.98070	76.36180	14:19:36	D	3.40
14	KARNAL	ASSANDH	S-NPP	29.62080	76.55650	12:40:01	D	2.70
15	KARNAL	ASSANDH	S-NPP	29.62310	76.55870	12:40:01	D	4.60
16	KARNAL	CHIRAO	S-NPP	29.66610	76.82040	14:19:36	D	5.70
17	KARNAL	CHIRAO	S-NPP	29.74930	76.75480	12:40:01	D	2.40
18	KARNAL	GHARAUNDA	S-NPP	29.60470	77.01870	12:40:01	D	2.30
19	KARNAL	KARNAL	S-NPP	29.70740	77.05670	12:40:01	D	4.50
20	KARNAL	NILOKHERI	S-NPP	29.81140	76.74890	12:40:01	D	1.90
21	KARNAL	NILOKHERI	S-NPP	29.87570	76.98120	14:19:36	D	5.50
22	KURUKSHETRA	LADWA	S-NPP	29.95420	76.97560	12:40:01	D	4.10
23	KURUKSHETRA	PEHOWA	S-NPP	29.94220	76.66550	12:40:01	D	4.20
24	KURUKSHETRA	PEHOWA	S-NPP	29.97090	76.71610	12:40:01	D	2.80
25	KURUKSHETRA	PEHOWA	S-NPP	29.97210	76.71520	12:40:01	D	2.60
26	KURUKSHETRA	PEHOWA	S-NPP	29.99680	76.69960	14:19:36	D	3.30
27	KURUKSHETRA	PEHOWA	S-NPP	30.04400	76.52300	12:40:01	D	2.70
28	KURUKSHETRA	THANESAR	S-NPP	29.92280	76.91960	12:40:01	D	3.10
29	KURUKSHETRA	THANESAR	S-NPP	29.92370	76.91950	12:40:01	D	3.10
30	KURUKSHETRA	THANESAR	S-NPP	29.97040	76.92850	14:19:36	D	5.00

31	KURUKSHETRA	THANESAR	S-NPP	30.00540	76.74330	14:19:36	D	2.80
32	KURUKSHETRA	THANESAR	S-NPP	30.06260	76.77690	12:40:01	D	1.30
33	KURUKSHETRA	THANESAR	S-NPP	30.07250	76.84080	12:40:01	D	4.00
34	YAMUNANAGAR	BILASPUR	S-NPP	30.27290	77.25900	12:40:01	D	1.60
35	YAMUNANAGAR	CHHACHHRAULI	S-NPP	30.26160	77.45610	12:40:01	D	2.50
36	YAMUNANAGAR	CHHACHHRAULI	S-NPP	30.26420	77.45480	12:40:01	D	2.50

Details of residue burning events in Rajasthan on 15-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	BUNDI	KESHORAIPATAN	S-NPP	25.42390	76.06220	12:40:01	D	9.80
2	BUNDI	KESHORAIPATAN	S-NPP	25.42530	76.05860	12:40:01	D	8.70

Details of residue burning events in Madhya Pradesh on 15-Oct-2022

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	EAST NIMAR	HARSUD	S-NPP	22.10560	76.83170	01:29:19	N	2.10
2	NARSHIMAPURA	TENDUKHERA	S-NPP	23.14340	79.00510	12:40:01	D	1.50

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

Study Team

ICAR - IARI	Dr V.K. Sehgal	Principal & Nodal Scientist	iaricreams@gmail.com
	Dr Rajkumar Dhakar	Scientist	rajdhakar.iari@gmail.com
	Mr Mohd Jahangir	Lab Assistant (KRISHI)	mjahangir198@gmail.com
ICAR - ATARI	Dr Rajbir Singh	Director ATARI (Zone-I) Ludhiana	rajbirsingh.zpd@gmail.com
	Dr S.K. Singh	Director ATARI (Zone-II) Jodhpur	sushilsinghiipr@yahoo.co.in
	Dr Atar Singh	Director ATARI (Zone-III) Kanpur	zpdicarkanpur@gmail.com
ICAR - IASRI	Dr Rajender Parsad	Director	rajender.parsad@icar.gov.in

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>)
