



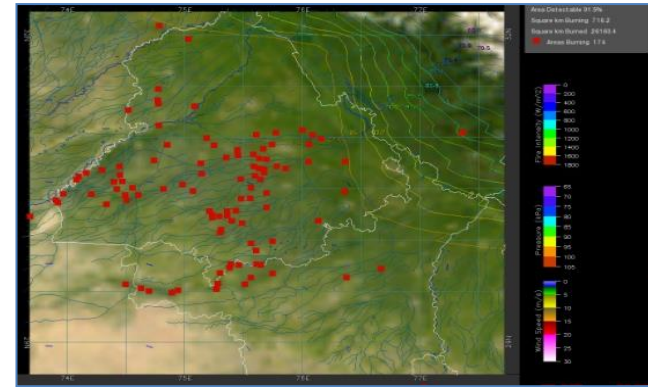
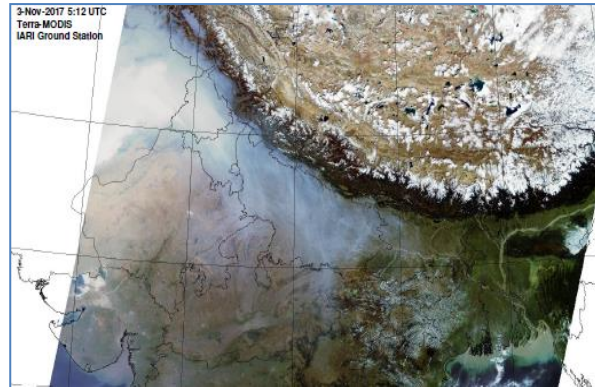
Bulletin No. 30

Events Date:
30-Apr-2023

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MONITORING WHEAT RESIDUE BURNING IN INDIA USING SATELLITE REMOTE SENSING DURING 2023



Prepared by:

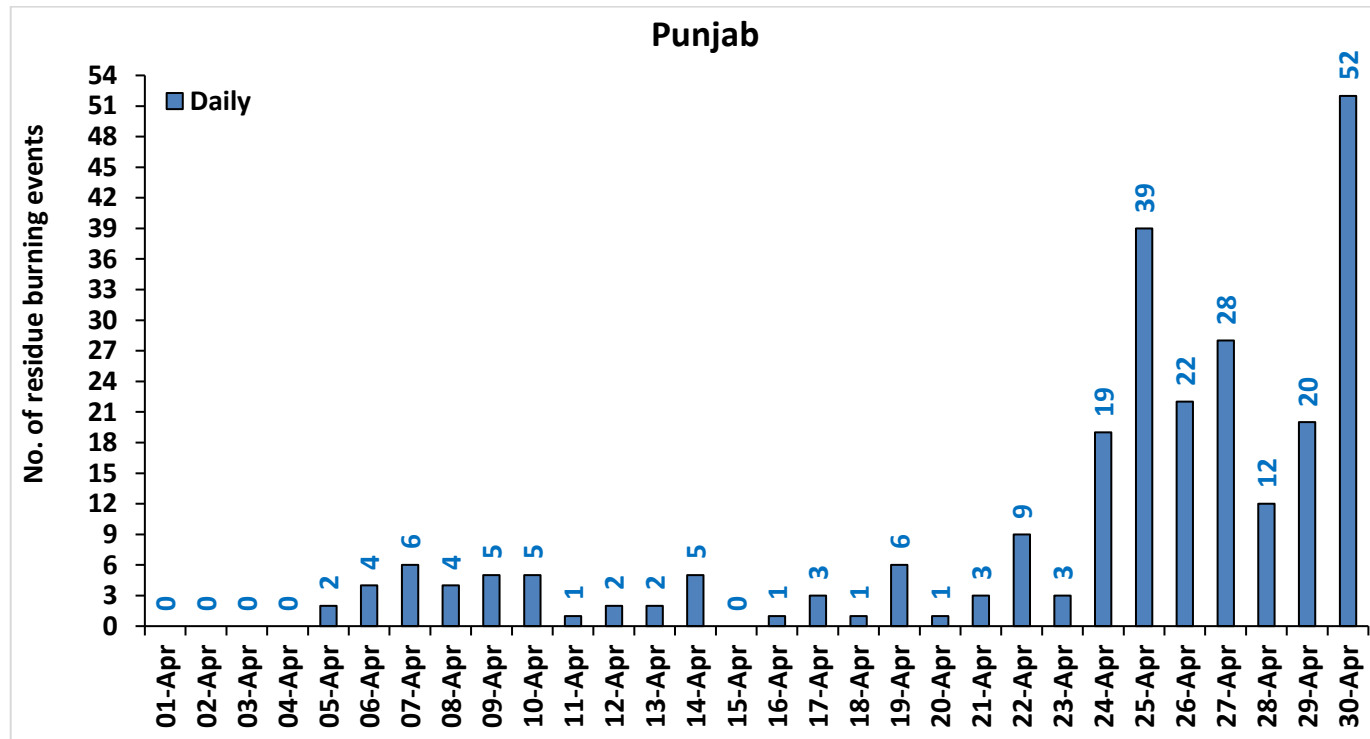
Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012

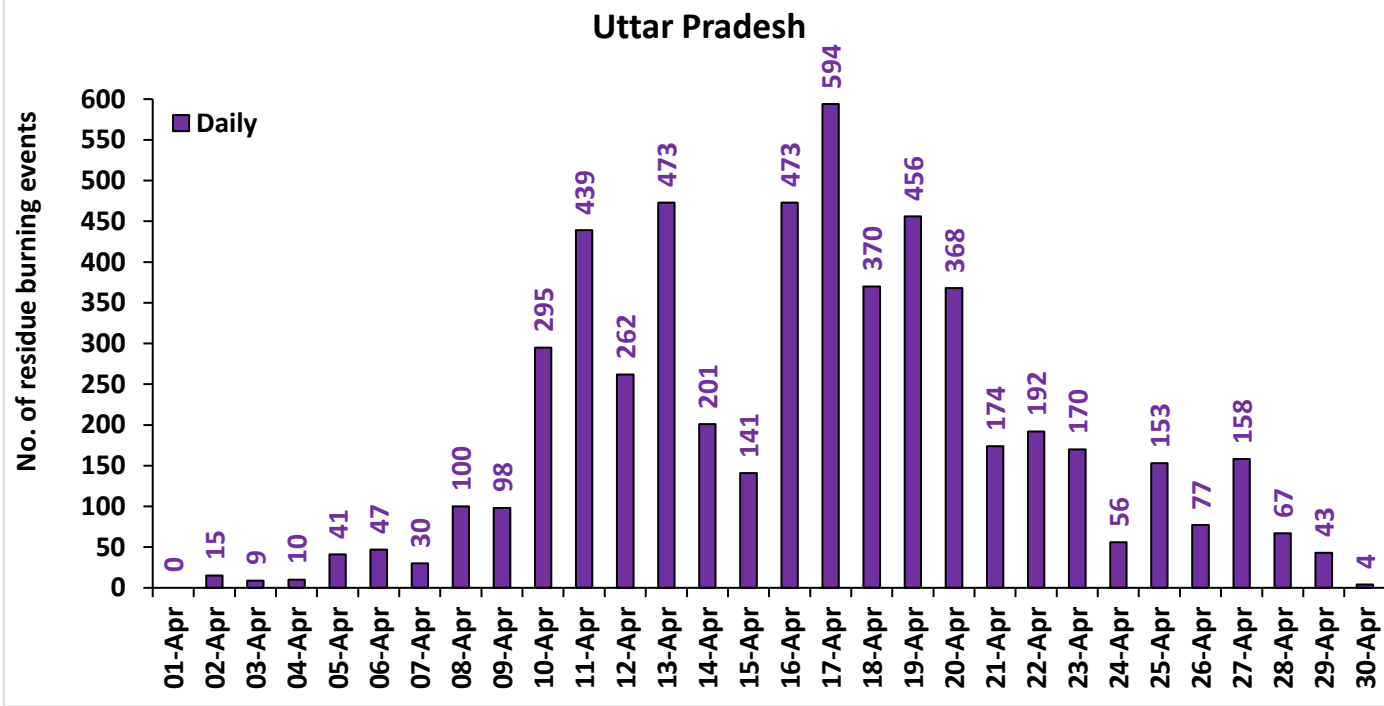
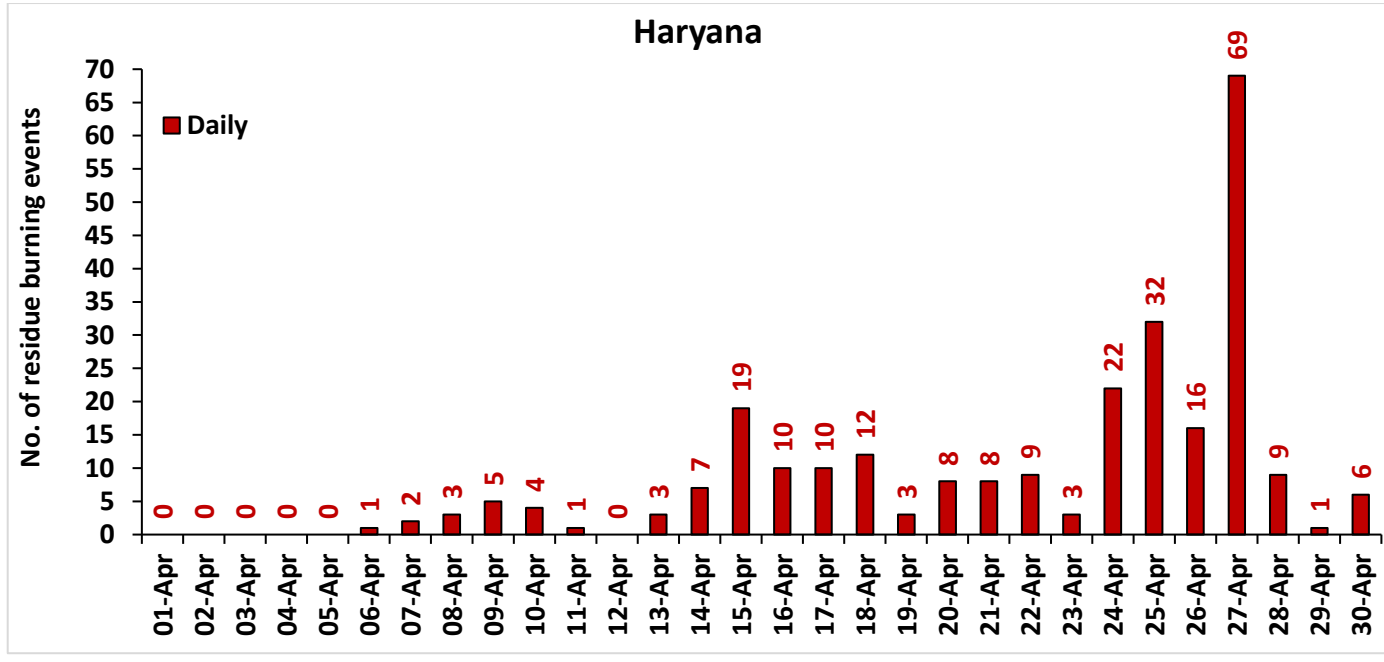
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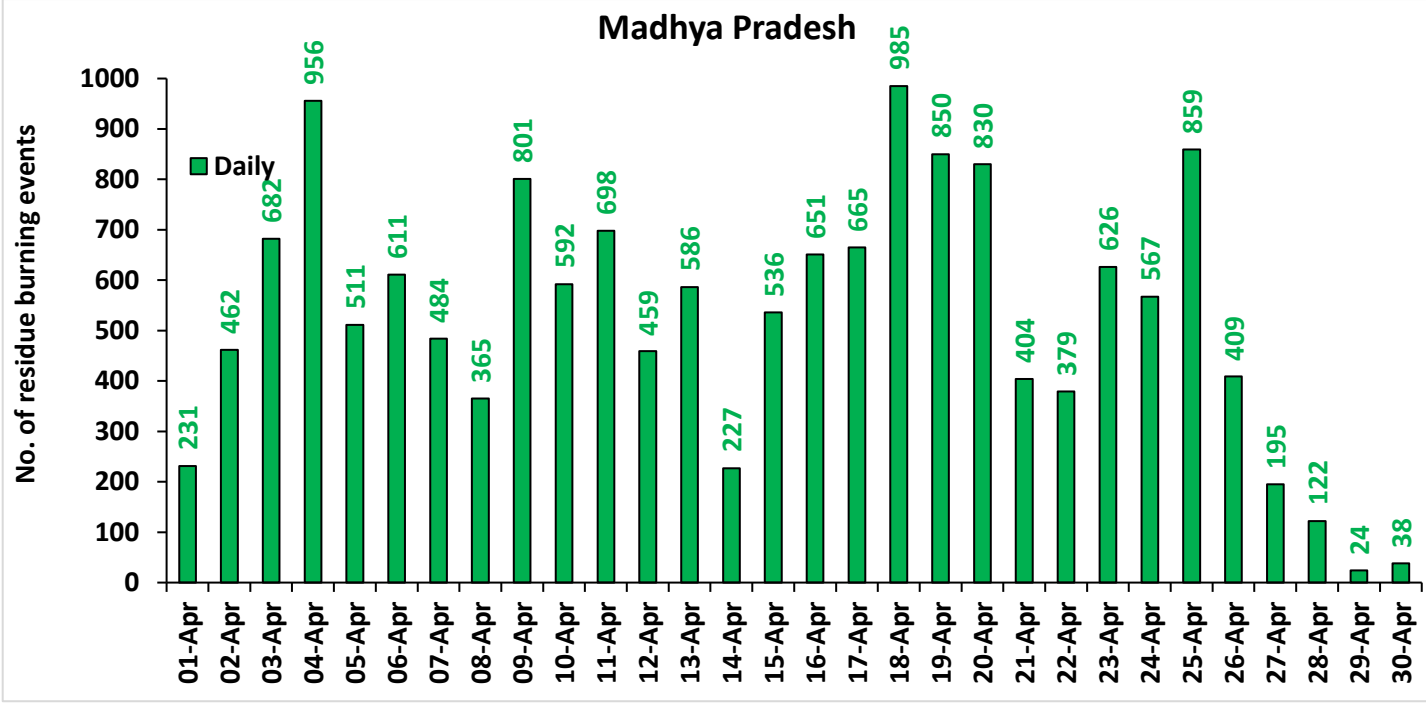
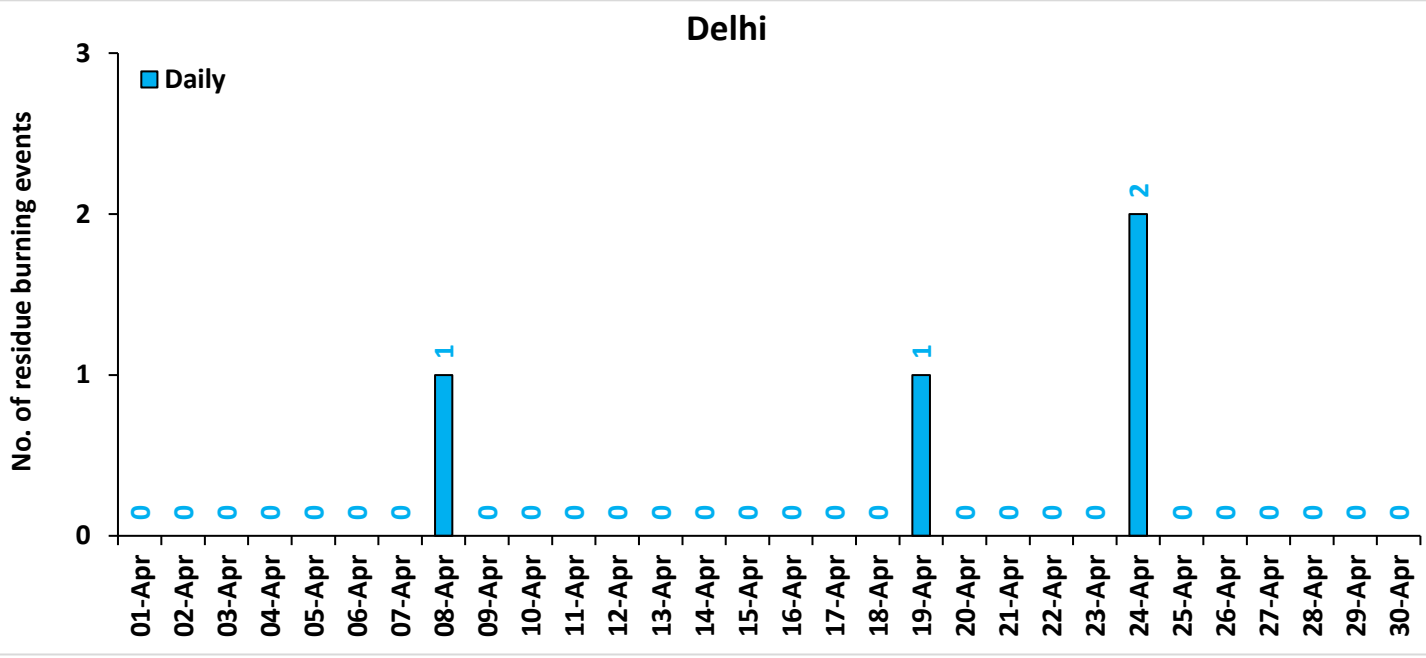
Highlights for 30-April-2023

- The active fire events due to wheat 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 **100** residue burning events in the five study States on 30-Apr-2023.
- The state wise events detected on 30-Apr-2023 were **52** in Punjab, **06** in Haryana, **00** in Delhi, **04** in Uttar Pradesh and **38** in Madhya Pradesh.
- The number of events has increased from **88** on 29-Apr-2023 to **100** on 30-Apr-2023 in the five study states.
- Total **21843** burning events were detected in the five states between 01-Apr-2023 and 30-Apr-2023, which are distributed as **255**, **263**, **5516**, **04**, and **15805** in Punjab, Haryana, UP, Delhi, and MP, respectively.

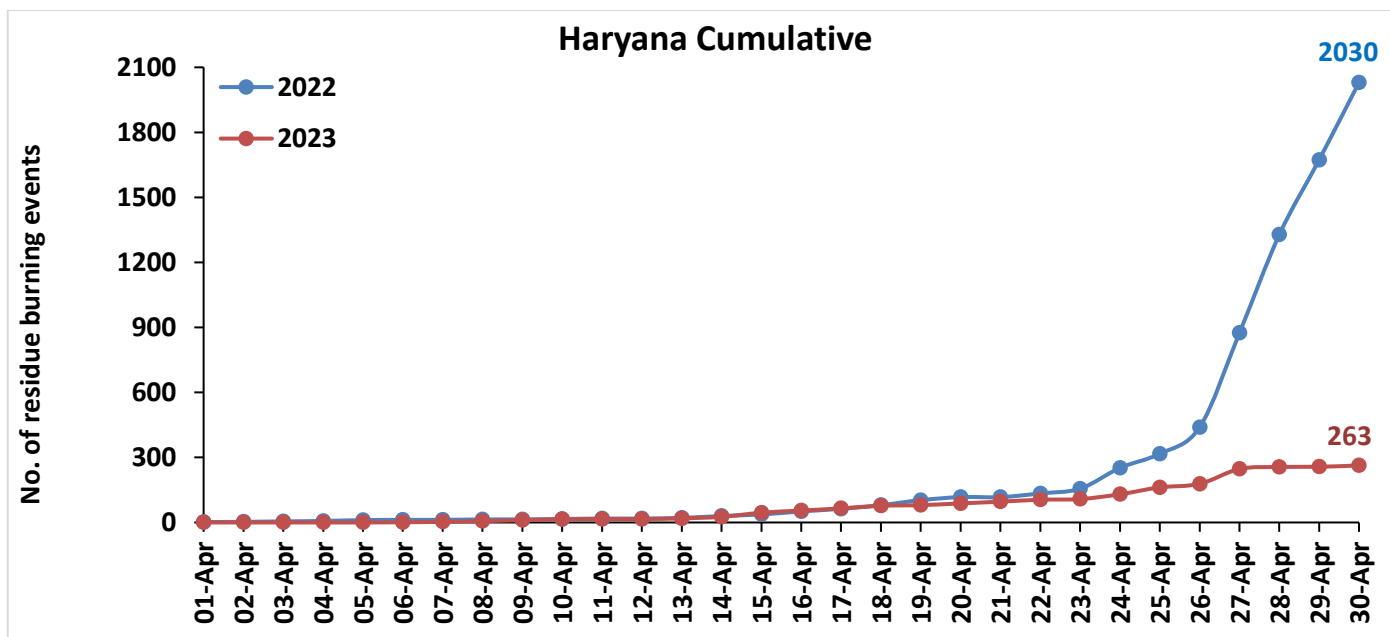
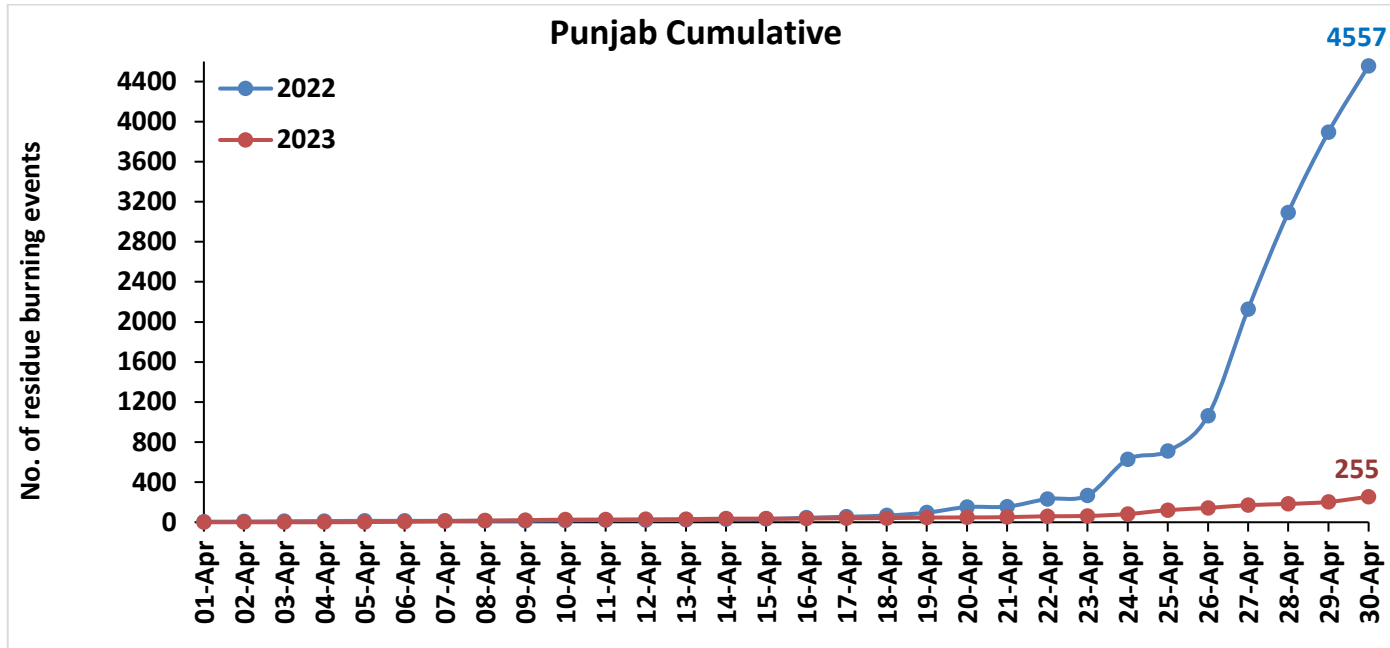
Temporal distribution of wheat residue burning events for the study States in 2023



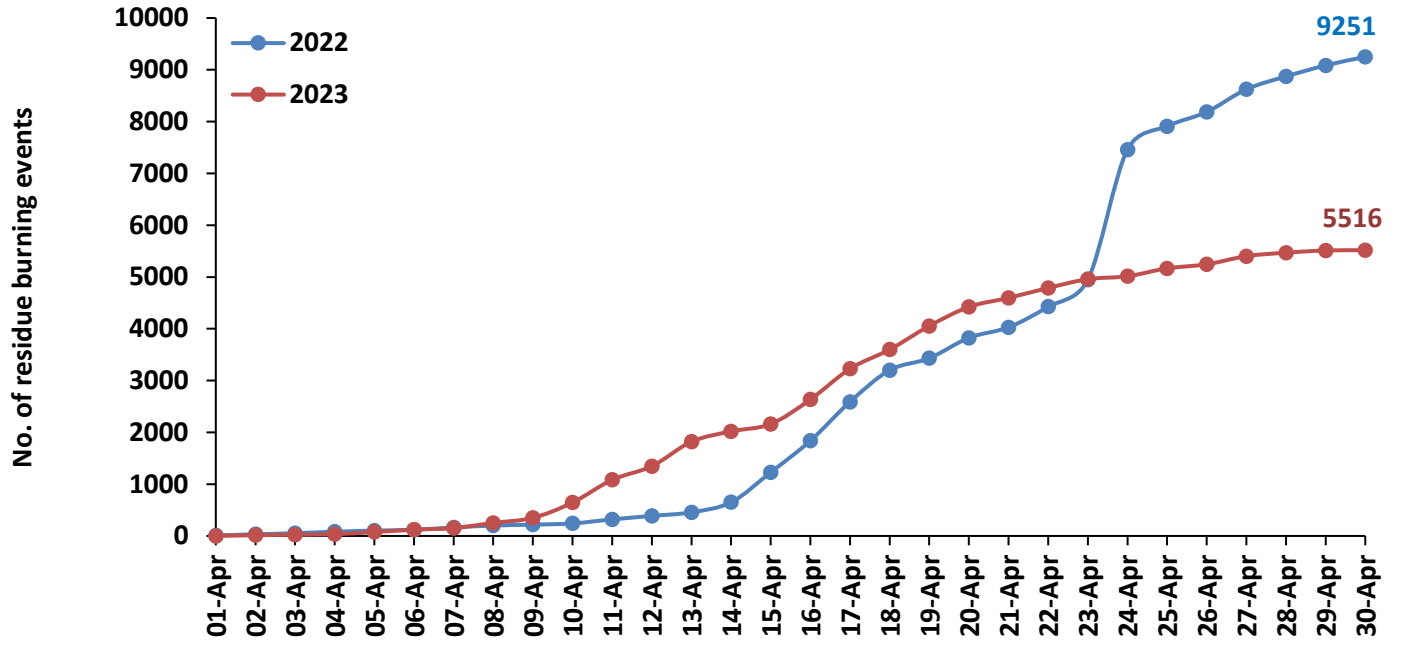




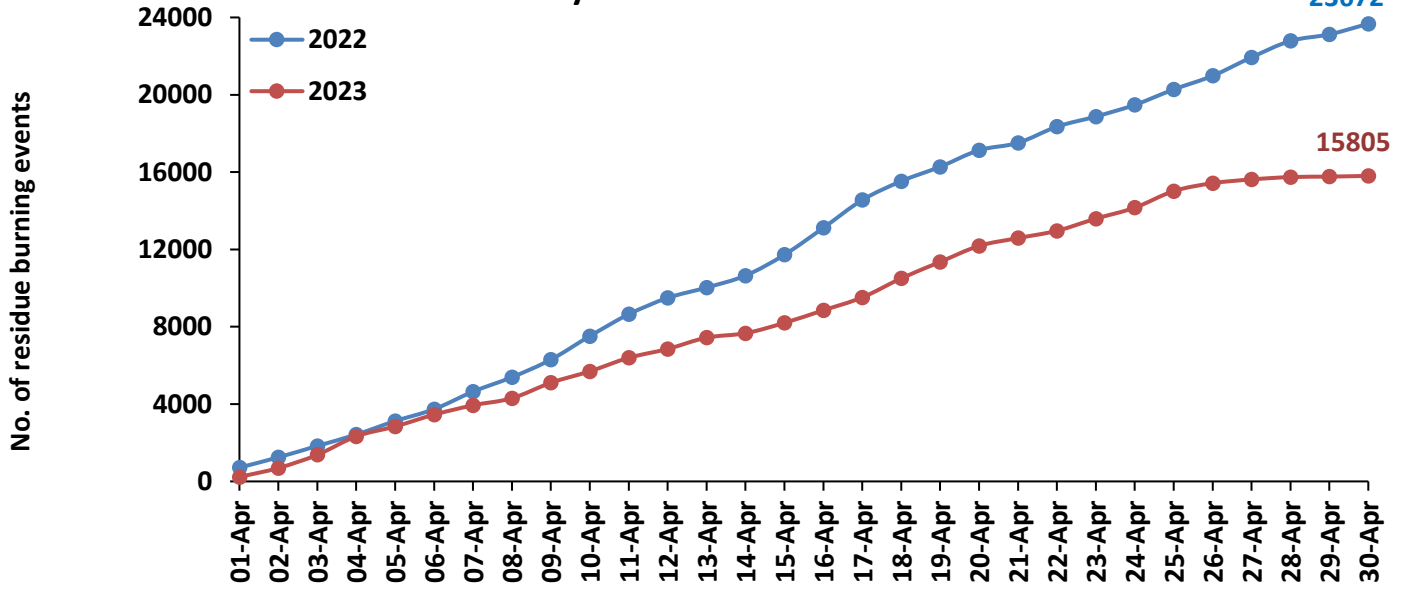
Comparison of residue burning events in current year (2023) with previous year (2022) for the study States



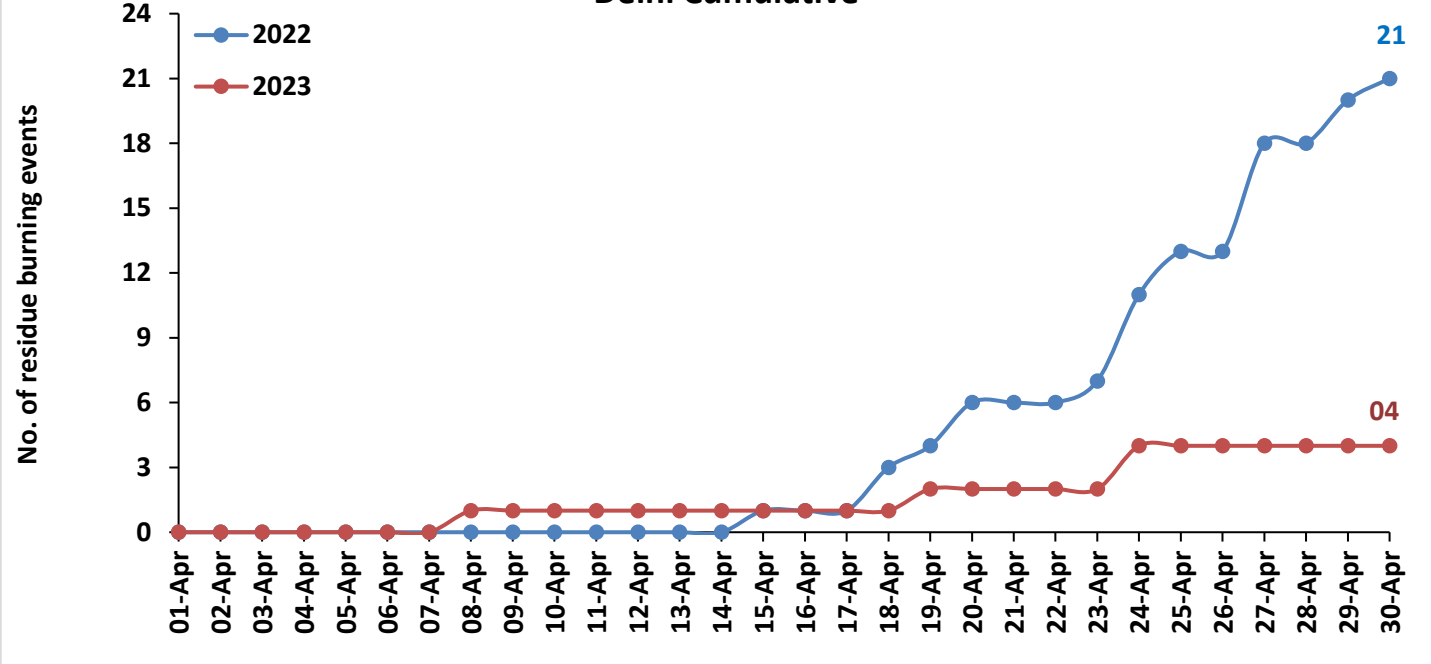
Uttar Pradesh Cumulative



Madhya Pradesh Cumulative



Delhi Cumulative



District-wise cumulative number of wheat residue burning events detected in 2022 and 2023
(Period: 01-30 April)

(a) Punjab

District	01-30 Apr	
	2022	2023
Amritsar	278	5
Barnala	220	20
Bathinda	325	30
Faridkot	119	5
Fatehgarh Sahib	22	1
Fazilka	252	6
Firozpur	439	6
Gurdaspur	243	9
Hoshiarpur	211	7
Jalandhar	131	8
Kapurthala	206	14
Ludhiana	194	11
Mansa	285	47
Moga	295	3
Muktsar	145	13
Pathankot	49	6
Patiala	230	17
Rupnagar	12	1
Sangrur	540	41
SAS NAGAR (Mohali)	11	1
SBS Nagar	20	2
Tarn Taran	330	2
Total	4557	255

(b) Haryana

District	01-30 Apr	
	2022	2023
AMBALA	69	5
BHIWANI	61	4
CHARKHI DADRI	4	2
FARIDABAD	8	8
FATEHABAD	128	13
GURGAON	6	8
HISAR	71	16
JHAJJAR	108	26
JIND	258	13
KAITHAL	216	7
KARNAL	310	14
KURUKSHETRA	110	7
MAHENDRAGARH	0	0
MEWAT	0	4
PALWAL	31	26
PANCHKULA	2	0
PANIPAT	169	12
REWARI	3	1
ROHTAK	160	12
SIRSA	87	46
SONIPAT	221	31
YAMUNANAGAR	8	8
Total	2030	263

(c) Uttar Pradesh

District	01-30 Apr							
	2022	2023						
			GAUTAMBUDHNAGAR	25	18	MUZAFARNAGAR	45	27
			GAZIPUR	67	30	PILHIBHIT	178	43
AGRA	0	0	GHAZIABAD	12	5	PRATAPGARH	16	13
ALIGARH	17	27	GONDA	18	23	RAIBEARELI	80	10
ALLAHABAD	70	20	GORAKHPUR	864	362	RAMPUR	64	16
AMBEDKARNAGAR	5	9	HAMIRPUR	8	10	SANTKABIRNAGAR	656	427
AURAIYA	45	7	HARDOI	58	20	SANTRAVIDASNAGAR	1	1
AZAMGARH	66	68	JALAUN	10	2	SHAHJAHANPUR	197	34
BADAUN	6	2	JAUNPUR	17	6	SHARANPUR	21	7
BAGHPAT	5	1	JHANSI	60	55	SHRAWASTI	69	36
BAHRAICH	86	35	JYOTIBAPHULE NAGAR	6	1	SIDDHARTHANAGAR	2462	1842
BALLIA	93	180	KANNAUJ	0	1	SITAPUR	15	12
BALRAMPUR	220	86	KANPUR	6	0	SONBHADRA	109	18
BANDA	3	1	KANPUR DEHAT	18	1	SULTANPUR	51	20
BARABANKI	5	2	KAUSHAMBI	3	3	UNNAO	32	2
BAREILLY	65	12	KHERI	119	42	VARANASI	1	0
BASTI	392	216	KUSHINAGAR	204	92	Total	9251	5516
BIJNOR	34	20	LACKNOW	4	0			
BULANDSAHAR	7	7	LALITPUR	30	29			
CHANDAULI	241	25	MAHAMAYANAGAR	0	1			
CHITRAKOOT	19	2	MAHARAJGANJ	1472	976			
DEORIA	691	438	MAHOBA	2	16			
ETAH	1	0	MAINPURI	1	4			
ETAWAH	3	3	MATHURA	22	44			
FAIZABAD	2	9	MAU	62	55			
FARRUKHABAD	3	2	MEERUT	9	13			
FATEHPUR	24	6	MIRZAPUR	50	7			
FIROZABAD	1	0	MORADABAD	3	14			

(d) Madhya Pradesh

District	01-30 Apr				
	2022	2023			
			PANNA	112	56
ALIRAJPUR	0	0	RAISEN	2444	1420
ANUPPUR	29	1	RAJGARH	93	133
ASHOKNAGAR	574	200	RATLAM	149	268
BALAGHAT	20	0	REWA	73	11
BARWANI	4	6	SAGAR	661	473
BETUL	153	40	SATNA	501	97
BHIND	40	25	SEHORE	838	609
BHOPAL	829	418	SEONI	1401	613
BURHANPUR	10	1	SHAHDOL	91	8
CHHATARPUR	97	49	SHAJAPUR	282	491
CHHINDWARA	371	191	SHEOPUR	281	343
DAMOH	178	213	SHIVPURI	135	74
DATIA	229	130	SIDHI	19	0
DEWAS	522	550	SINGRAULI	94	3
DHAR	980	863	TIKAMGARH	23	38
DINDORI	40	3	UJJAIN	1091	1654
EAST NIMAR	73	102	UMARIA	35	4
GUNA	591	339	VIDESHA	3490	1499
GWALIOR	406	216	WEST NIMAR	27	37
HARDA	354	241	Total	23672	15805
HOSHANGABAD	4057	2753			
INDORE	938	992			
JABALPUR	772	352			
JHABUA	2	6			
KATNI	233	64			
MANDLA	141	19			
MANDSAUR	52	83			
MORENA	3	0			
NARSHIMAPURA	120	83			
NIMACH	14	34			

(e) Delhi

District	01-30 Apr	
	2022	2023
CENTRAL	0	0
EAST	0	0
NEW DELHI	0	0
NORTH	17	2
NORTH EAST	0	0
NORTH WEST DELHI	1	0
SHAHADRA	0	0
SOUTH	1	0
SOUTH EAST	0	0
SOUTH WEST DELHI	1	1
WEST DELHI	1	1
Total	21	4

State-wise and date-wise number of wheat residue burning events detected in 2022 and 2023
(Period: 01-30 April)

Date	Punjab		Haryana		Uttar Pradesh		Delhi		Madhya Pradesh	
	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
01-Apr	6	0	2	0	10	0	0	0	715	231
02-Apr	1	0	1	0	22	15	0	0	531	462
03-Apr	3	0	2	0	21	9	0	0	589	682
04-Apr	2	0	2	0	29	10	0	0	589	956
05-Apr	2	2	4	0	21	41	0	0	698	511
06-Apr	0	4	1	1	16	47	0	0	612	611
07-Apr	0	6	0	2	46	30	0	0	908	484
08-Apr	1	4	2	3	37	100	0	1	749	365
09-Apr	0	5	0	5	16	98	0	0	907	801
10-Apr	4	5	2	4	24	295	0	0	1217	592
11-Apr	2	1	2	1	78	439	0	0	1129	698
12-Apr	0	2	0	0	67	262	0	0	847	459
13-Apr	3	2	3	3	70	473	0	0	537	586
14-Apr	7	5	9	7	193	201	0	0	618	227
15-Apr	1	0	7	19	579	141	1	0	1079	536
16-Apr	13	1	14	10	609	473	0	0	1390	651
17-Apr	10	3	12	10	751	594	0	0	1441	665
18-Apr	12	1	17	12	611	370	2	0	972	985
19-Apr	29	6	23	3	231	456	1	1	748	850
20-Apr	56	1	14	8	395	368	2	0	856	830
21-Apr	4	3	0	8	202	174	0	0	379	404
22-Apr	77	9	17	9	398	192	0	0	839	379
23-Apr	35	3	22	2	519	170	1	0	524	626
24-Apr	360	19	96	22	2515	56	4	2	605	567
25-Apr	82	39	65	32	450	153	2	0	796	859

26-Apr	354	22	122	16	277	77	0	0	706	409
27-Apr	1064	28	436	69	436	158	5	0	955	195
28-Apr	965	12	453	9	249	67	0	0	849	122
29-Apr	802	20	345	1	213	43	2	0	340	24
30-Apr	662	52	357	6	166	4	1	0	547	38
Total	4557	255	2030	263	9251	5516	21	4	23672	15805

Details of residue burning events in Punjab on 30-Apr-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	BARNALA	SEHNA	S-NPP	30.44741	75.35429	12:47:04	D	3.70
2	BATHINDA	RAMPURA	TERRA	30.13100	75.28500	10:36:15	D	20.10
3	BATHINDA	RAMPURA	S-NPP	30.17097	75.34079	12:47:04	D	5.60
4	FAZILKA	FAZILKA	S-NPP	30.32023	73.96584	14:27:21	D	4.20
5	HOSHIARPUR	HAJIPUR	S-NPP	31.89905	75.70923	12:47:04	D	2.80
6	HOSHIARPUR	MUKERIAN	S-NPP	31.98856	75.60275	12:47:04	D	6.00
7	KAPURTHALA	NADALA	S-NPP	31.55711	75.47909	12:47:04	D	4.40
8	KAPURTHALA	NADALA	S-NPP	31.55805	75.48294	12:47:04	D	4.40
9	KAPURTHALA	NADALA	S-NPP	31.55898	75.48679	12:47:04	D	6.90
10	KAPURTHALA	NADALA	S-NPP	31.57992	75.48979	12:47:04	D	3.20
11	LUDHIANA	MACHHIWARA	S-NPP	30.87081	76.24956	12:47:04	D	3.70
12	MANSA	BHIKHI	AQUA	30.06300	75.59400	14:21:42	D	23.90
13	MANSA	BHIKHI	S-NPP	30.01510	75.50919	12:47:04	D	1.70
14	MANSA	BHIKHI	S-NPP	30.03545	75.56879	12:47:04	D	9.00
15	MANSA	BHIKHI	S-NPP	30.08363	75.45624	12:47:04	D	2.10
16	MANSA	BHIKHI	S-NPP	30.13499	75.36137	12:47:04	D	5.60
17	MANSA	BHIKHI	S-NPP	30.13591	75.35889	12:47:04	D	4.90
18	MANSA	BUDHLADA	S-NPP	29.85459	75.68345	12:47:04	D	3.80
19	MANSA	BUDHLADA	S-NPP	29.88380	75.56474	12:47:04	D	2.20
20	MANSA	BUDHLADA	S-NPP	29.91325	75.54214	12:47:04	D	4.50
21	MANSA	BUDHLADA	S-NPP	29.91422	75.71230	12:47:04	D	7.30
22	MANSA	BUDHLADA	S-NPP	29.92123	75.57485	12:47:04	D	8.50
23	MANSA	BUDHLADA	S-NPP	29.93357	75.60169	12:47:04	D	3.00
24	MANSA	BUDHLADA	S-NPP	29.93891	75.60284	14:27:21	D	10.70
25	MANSA	BUDHLADA	S-NPP	29.93896	75.59997	12:47:04	D	3.00
26	MANSA	BUDHLADA	S-NPP	29.93995	75.60404	12:47:04	D	3.00
27	MANSA	BUDHLADA	S-NPP	29.94308	75.60119	14:27:21	D	9.30
28	MANSA	BUDHLADA	S-NPP	29.96666	75.53448	14:27:21	D	8.90
29	MANSA	BUDHLADA	S-NPP	29.99634	75.59879	12:47:04	D	5.40
30	MANSA	BUDHLADA	S-NPP	29.99734	75.60284	12:47:04	D	5.40

31	MANSA	MANSA	S-NPP	29.98252	75.30399	12:47:04	D	2.40
32	MANSA	MANSA	S-NPP	30.03027	75.40634	12:47:04	D	6.40
33	PATHANKOT	PATHANKOT	S-NPP	32.24980	75.63327	12:47:04	D	2.60
34	PATIALA	PATRAN	S-NPP	29.92662	76.00705	14:27:21	D	8.90
35	PATIALA	PATRAN	S-NPP	29.93155	76.00780	14:27:21	D	7.70
36	RUPNAGAR	CHAMKAUR SAHIB	S-NPP	30.84702	76.42490	12:47:04	D	4.40
37	SANGRUR	ANDANA	S-NPP	29.80205	75.89315	12:47:04	D	3.90
38	SANGRUR	LEHRA GAGA	S-NPP	29.82968	75.84202	12:47:04	D	3.30
39	SANGRUR	LEHRA GAGA	S-NPP	29.84137	75.79562	12:47:04	D	3.20
40	SANGRUR	LEHRA GAGA	S-NPP	29.97167	75.66323	12:47:04	D	7.60
41	SANGRUR	LEHRA GAGA	S-NPP	29.97176	75.66372	12:47:04	D	7.00
42	SANGRUR	SANGRUR	S-NPP	30.14552	75.59028	12:47:04	D	7.30
43	SANGRUR	SANGRUR	S-NPP	30.14651	75.59431	12:47:04	D	8.40
44	SANGRUR	SANGRUR	S-NPP	30.19069	75.70533	12:47:04	D	7.00
45	SANGRUR	SANGRUR	S-NPP	30.22278	75.64789	14:27:21	D	5.30
46	SANGRUR	SANGRUR	S-NPP	30.24272	75.75010	12:47:04	D	2.30
47	SANGRUR	SANGRUR	S-NPP	30.25380	75.77197	12:47:04	D	3.70
48	SANGRUR	SHER PUR	S-NPP	30.40720	75.68890	12:47:04	D	2.20
49	SANGRUR	SUNAM	S-NPP	30.00225	75.72381	14:27:21	D	7.30
50	SANGRUR	SUNAM	S-NPP	30.02980	75.68803	12:47:04	D	6.50
51	SANGRUR	SUNAM	S-NPP	30.07942	75.73347	14:27:21	D	3.80
52	SANGRUR	SUNAM	S-NPP	30.12915	75.88580	14:27:21	D	5.00

Details of residue burning events in Haryana on 30-Apr-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	FATEHABAD	JAKHAL	S-NPP	29.69575	75.70558	14:27:21	D	7.00
2	FATEHABAD	RATIA	S-NPP	29.76504	75.53123	12:47:04	D	7.20
3	FATEHABAD	TOHANA	S-NPP	29.66304	75.75017	12:47:04	D	2.60
4	SIRSA	ELLENABAD	S-NPP	29.47032	74.76457	12:47:04	D	5.00
5	SIRSA	ELLENABAD	S-NPP	29.49646	74.74602	12:47:04	D	8.40
6	SIRSA	RANIA	S-NPP	29.51607	74.79972	12:47:04	D	13.80

Details of residue burning events in Uttar Pradesh on 30-Apr-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	BAREILLY	BAREILLY	S-NPP	28.35839	79.59343	12:47:04	D	5.30
2	GAUTAMBUDHNAGAR	JEVAR	S-NPP	28.22784	77.57110	12:47:04	D	2.70
3	GAUTAMBUDHNAGAR	JEVAR	S-NPP	28.23151	77.57757	12:47:04	D	2.20
4	PILHIBHIT	PURANPUR	S-NPP	28.74787	80.20533	12:47:04	D	3.50

Details of wheat residue burning events in Madhya Pradesh on 30-Apr-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	ASHOKNAGAR	ASHOKNAGAR	S-NPP	24.66075	77.49891	12:47:04	D	2.80
2	ASHOKNAGAR	CHANDERI	S-NPP	24.75513	78.18428	12:47:04	D	3.80
3	ASHOKNAGAR	CHANDERI	S-NPP	24.81140	78.18810	12:47:04	D	3.10
4	ASHOKNAGAR	CHANDERI	S-NPP	24.81219	78.19164	12:47:04	D	5.10
5	ASHOKNAGAR	ISAGARH	S-NPP	24.79648	77.74129	12:47:04	D	5.60
6	ASHOKNAGAR	ISAGARH	S-NPP	24.80766	77.66543	12:47:04	D	1.60
7	ASHOKNAGAR	ISAGARH	S-NPP	24.81328	77.84488	14:27:21	D	6.70
8	ASHOKNAGAR	MUNGAOLI	S-NPP	24.30936	77.95152	12:47:04	D	3.20
9	DHAR	MANAWAR	S-NPP	22.26437	75.13071	01:37:04	N	0.80
10	GUNA	GUNA	S-NPP	24.89395	77.16745	12:47:04	D	5.10
11	GWALIOR	GWALIOR	S-NPP	25.88743	77.75130	12:47:04	D	6.40
12	GWALIOR	GWALIOR	S-NPP	25.88826	77.75494	12:47:04	D	6.40
13	RATLAM	ALOTOT	S-NPP	23.79630	75.56153	14:27:21	D	3.80
14	RATLAM	JAURA	S-NPP	23.70004	75.18394	12:47:04	D	10.20
15	RATLAM	JAURA	S-NPP	23.70048	75.18330	12:47:04	D	5.90
16	RATLAM	JAURA	S-NPP	23.70190	75.18892	12:47:04	D	5.90
17	RATLAM	JAURA	S-NPP	23.70773	75.18774	12:47:04	D	17.50
18	RATLAM	JAURA	S-NPP	23.70822	75.18712	12:47:04	D	5.90
19	RATLAM	PIPLODA	S-NPP	23.54624	74.93150	14:27:21	D	2.90
20	RATLAM	PIPLODA	S-NPP	23.60213	75.02112	14:27:21	D	5.90
21	RATLAM	RATLAM	S-NPP	23.27972	75.30529	14:27:21	D	11.20
22	RATLAM	RATLAM	S-NPP	23.46183	75.11534	14:27:21	D	8.50
23	SAGAR	BANDA	TERRA	23.92100	78.94700	10:36:15	D	11.00
24	SAGAR	BINA	S-NPP	24.25121	78.22981	12:47:04	D	1.10
25	SAGAR	REHLI	TERRA	23.70900	79.06600	10:36:15	D	17.00
26	SAGAR	SAGAR	TERRA	23.63300	78.88300	10:36:15	D	23.50
27	SAGAR	SAGAR	S-NPP	23.93770	78.58208	12:47:04	D	2.50
28	SATNA	RAGURAJNAGAR	S-NPP	24.70777	80.66912	12:47:04	D	5.60
29	SHAJAPUR	SUSNER	S-NPP	23.94290	76.06804	14:27:21	D	3.80
30	SHEOPUR	SHEOPUR	AQUA	25.45800	76.61500	14:21:42	D	24.40

31	SHEOPUR	SHEOPUR	S-NPP	25.45588	76.62173	14:27:21	D	28.70
32	SHIVPURI	POHRI	S-NPP	25.36579	77.18652	12:47:04	D	5.70
33	TIKAMGARH	TIKAMGARH	S-NPP	24.63256	78.86210	12:47:04	D	2.90
34	VIDESHA	BASODA	S-NPP	23.97514	78.02617	12:47:04	D	3.70
35	VIDESHA	KORWAI	S-NPP	24.05143	77.98605	12:47:04	D	1.70
36	VIDESHA	KORWAI	S-NPP	24.05267	77.98513	12:47:04	D	2.50
37	VIDESHA	VIDESHA	S-NPP	23.62081	77.64749	12:47:04	D	5.00
38	VIDESHA	VIDESHA	S-NPP	23.62634	77.64603	12:47:04	D	5.30

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 wheat mask for the Punjab, Haryana and Uttar Pradesh were provided by MNCFC, MoA&FW, Govt of India
The rabi crop mask for Delhi 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)
