



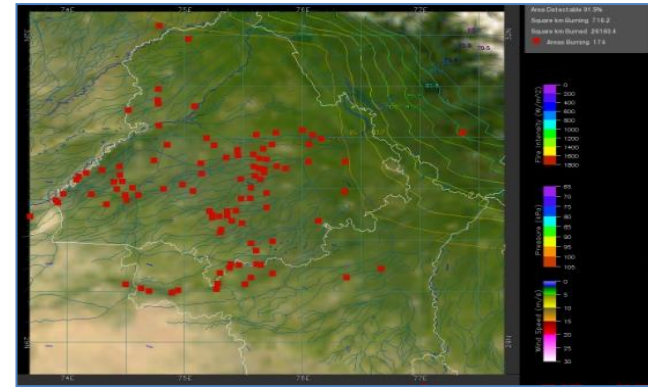
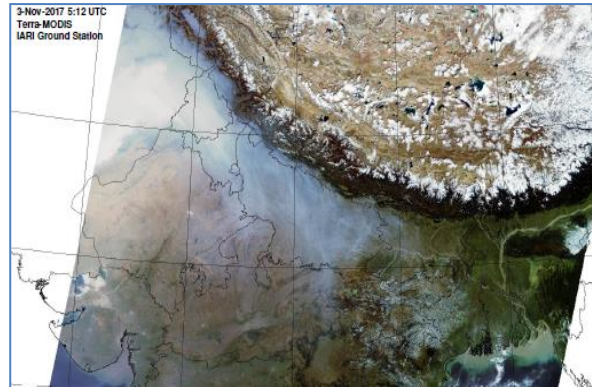
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# MONITORING WHEAT RESIDUE BURNING IN INDIA USING SATELLITE REMOTE SENSING DURING 2023



Prepared by:

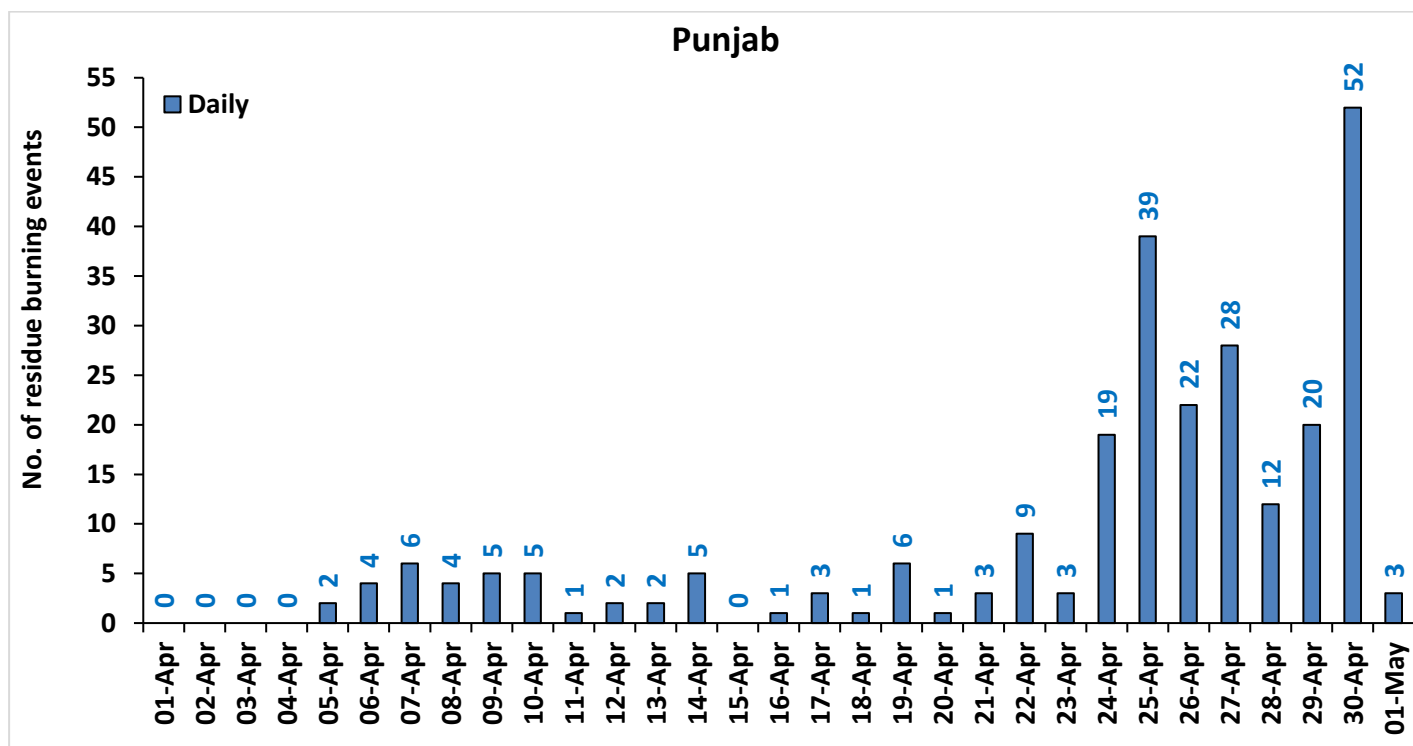
Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,  
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012

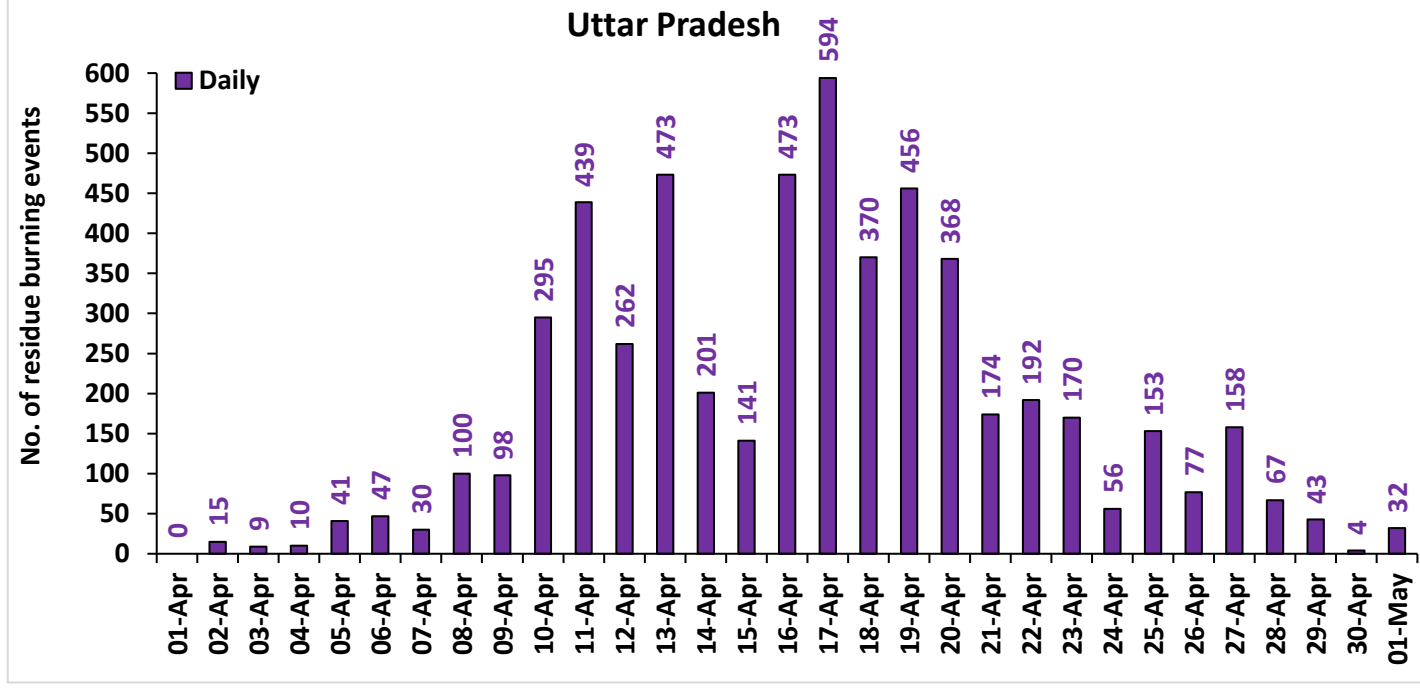
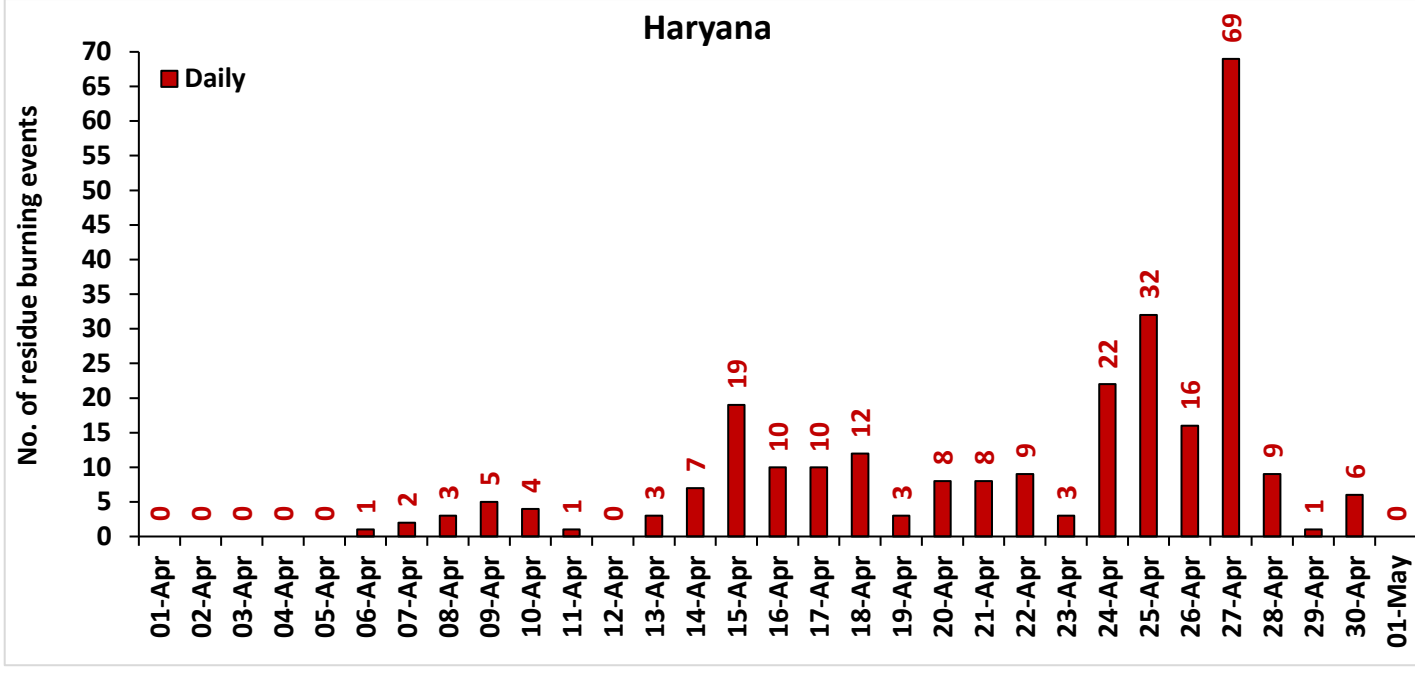
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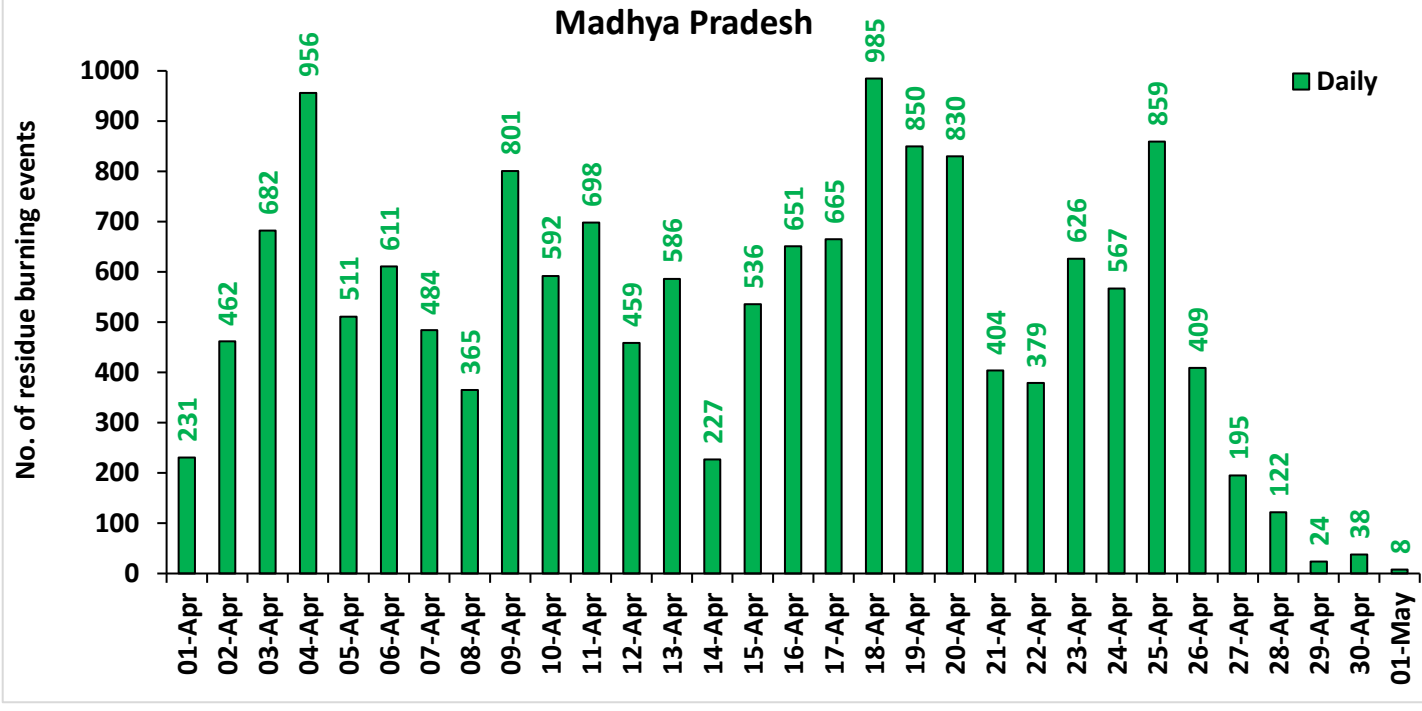
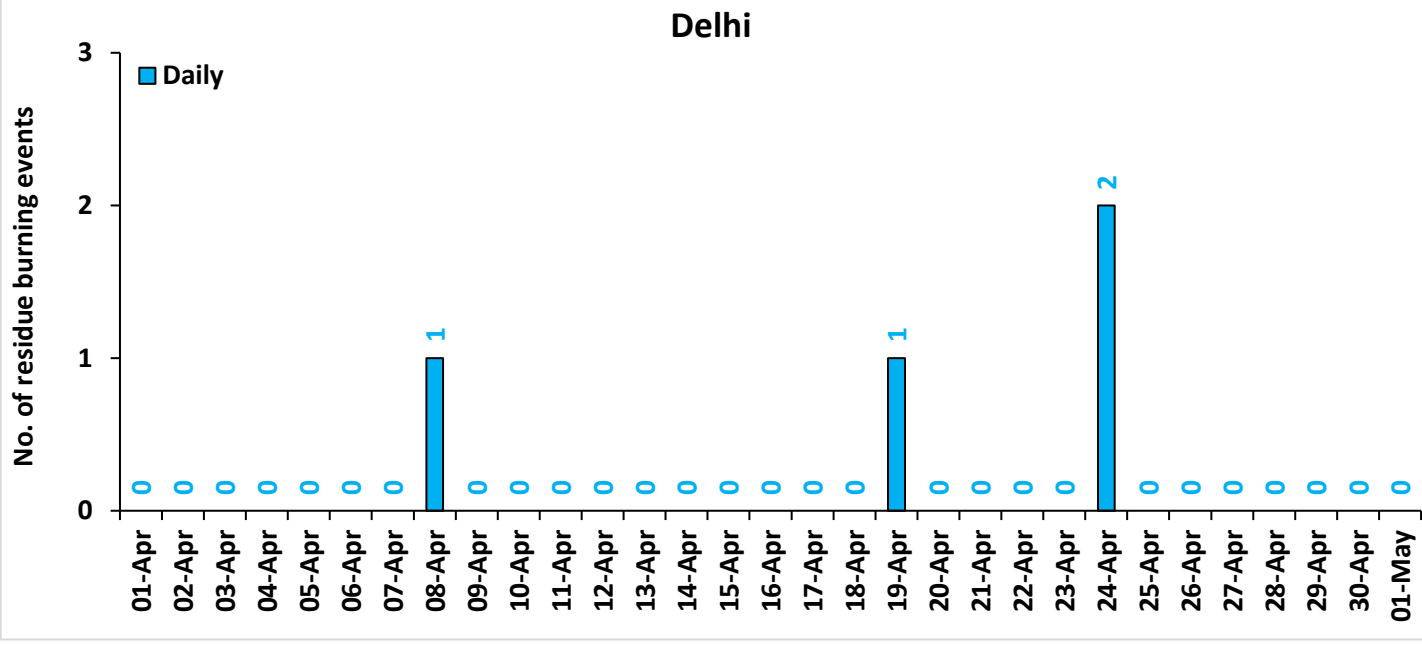
## Highlights for 01-May-2023

- 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 **43** residue burning events in the five study States on 01-May-2023.
- The state wise events detected on 01-May-2023 were **03** in Punjab, **00** in Haryana, **00** in Delhi, **32** in Uttar Pradesh and **08** in Madhya Pradesh.
- The number of events has decreased from **100** on 30-Apr-2023 to **43** on 01-May-2023 in the five study states.
- Total **21886** burning events were detected in the five states between 01-Apr-2023 and 01-May-2023, which are distributed as **258, 263, 5548, 04,** and **15813** in Punjab, Haryana, UP, Delhi, and MP, respectively.

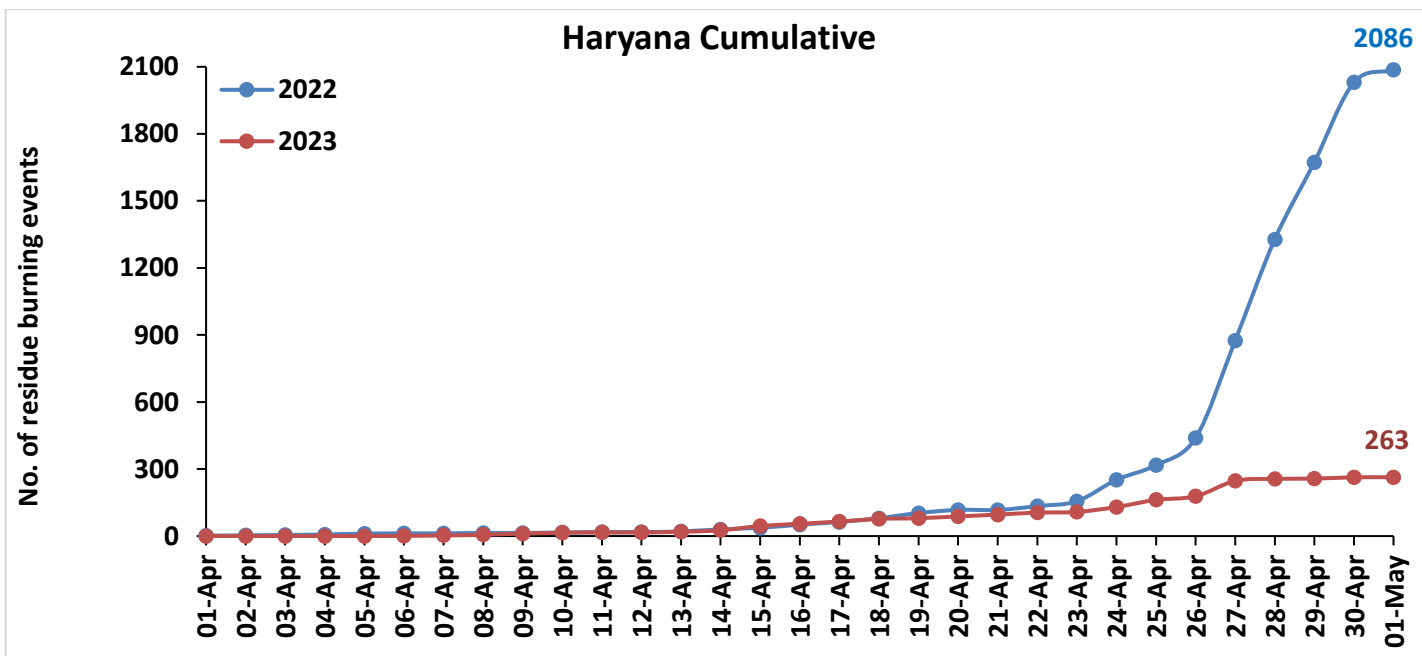
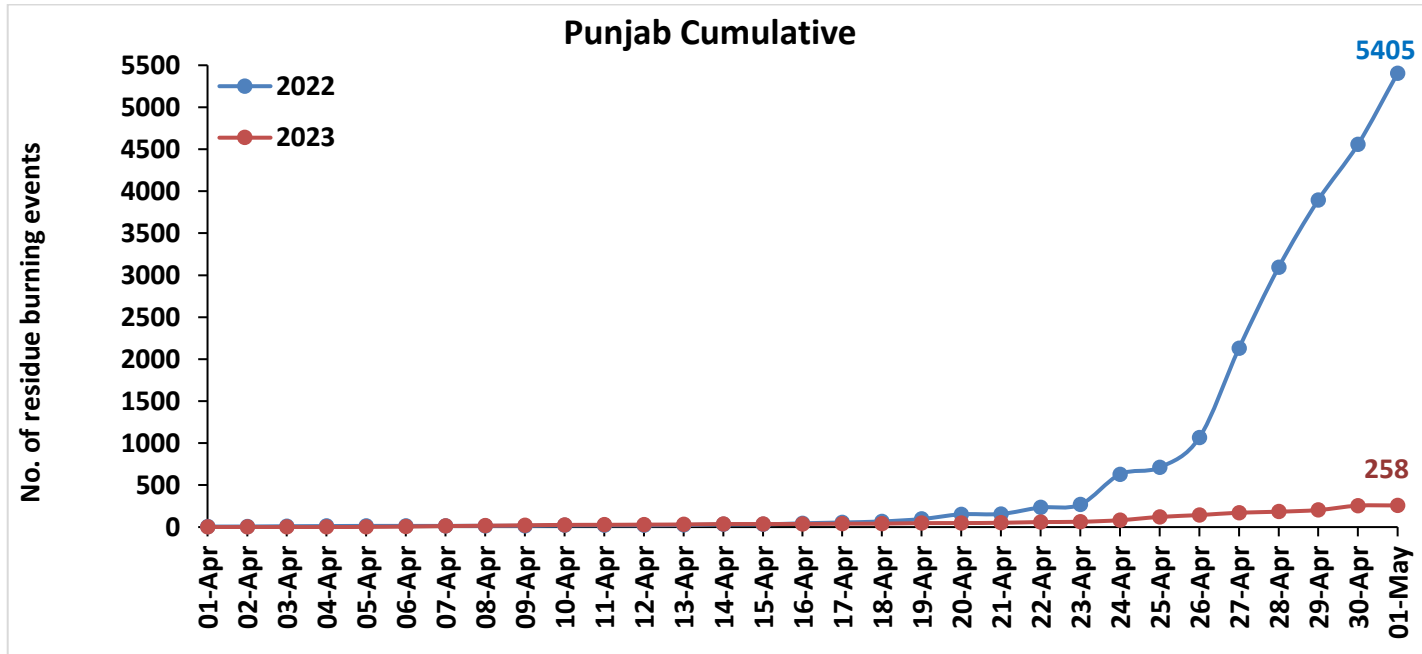
### Temporal distribution of wheat residue burning events for the study States in 2023

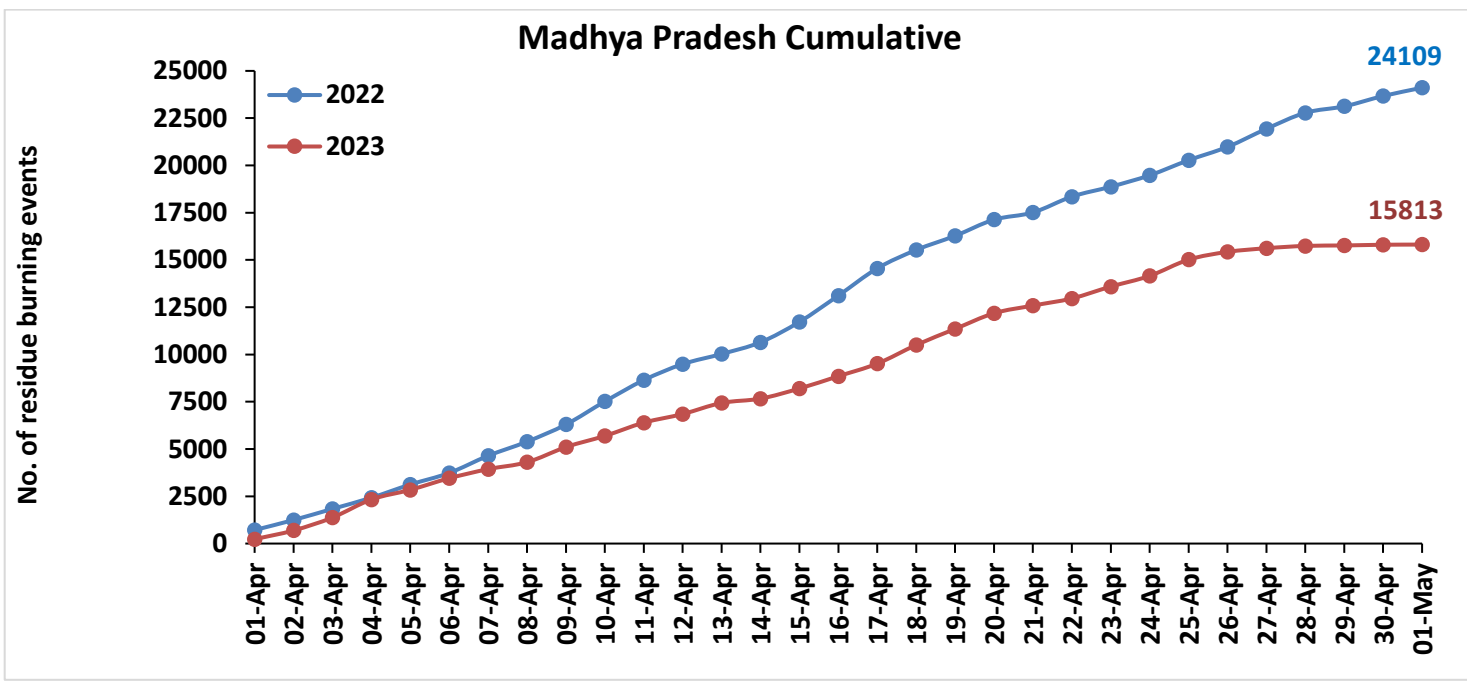
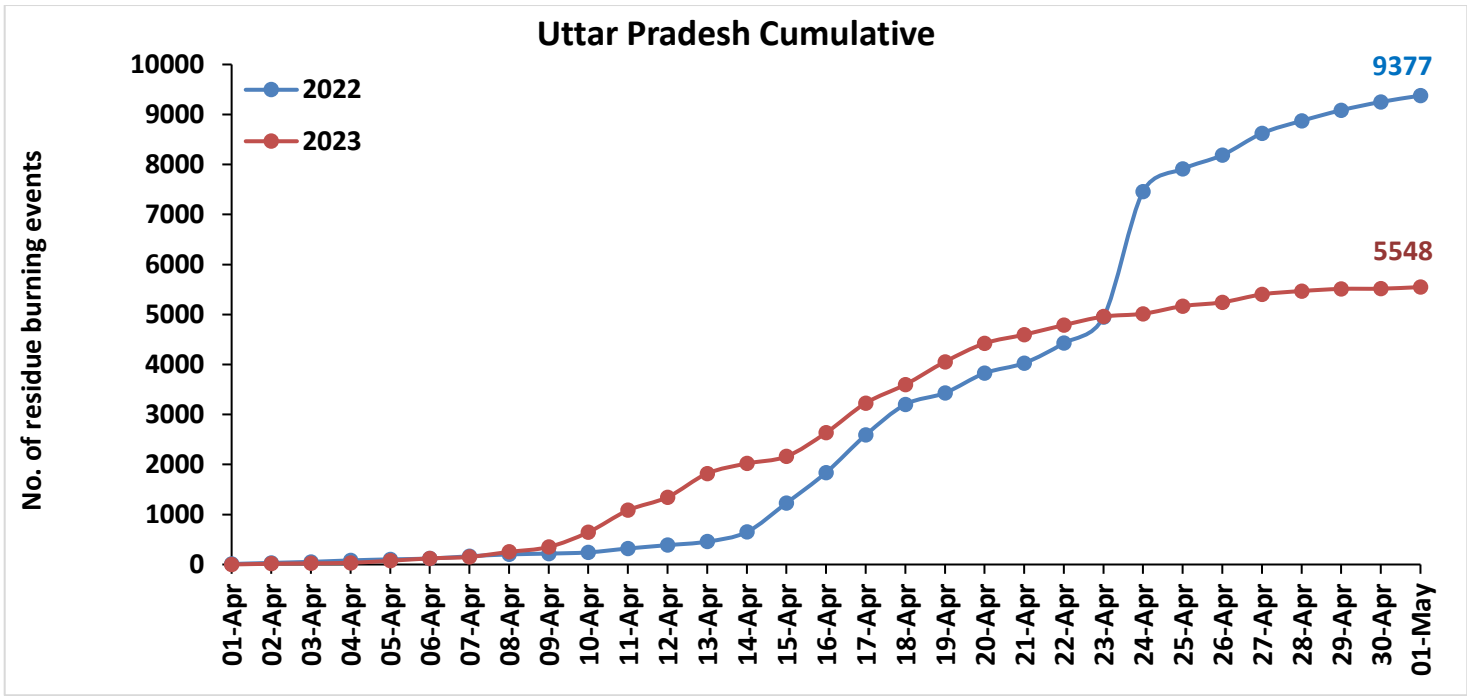




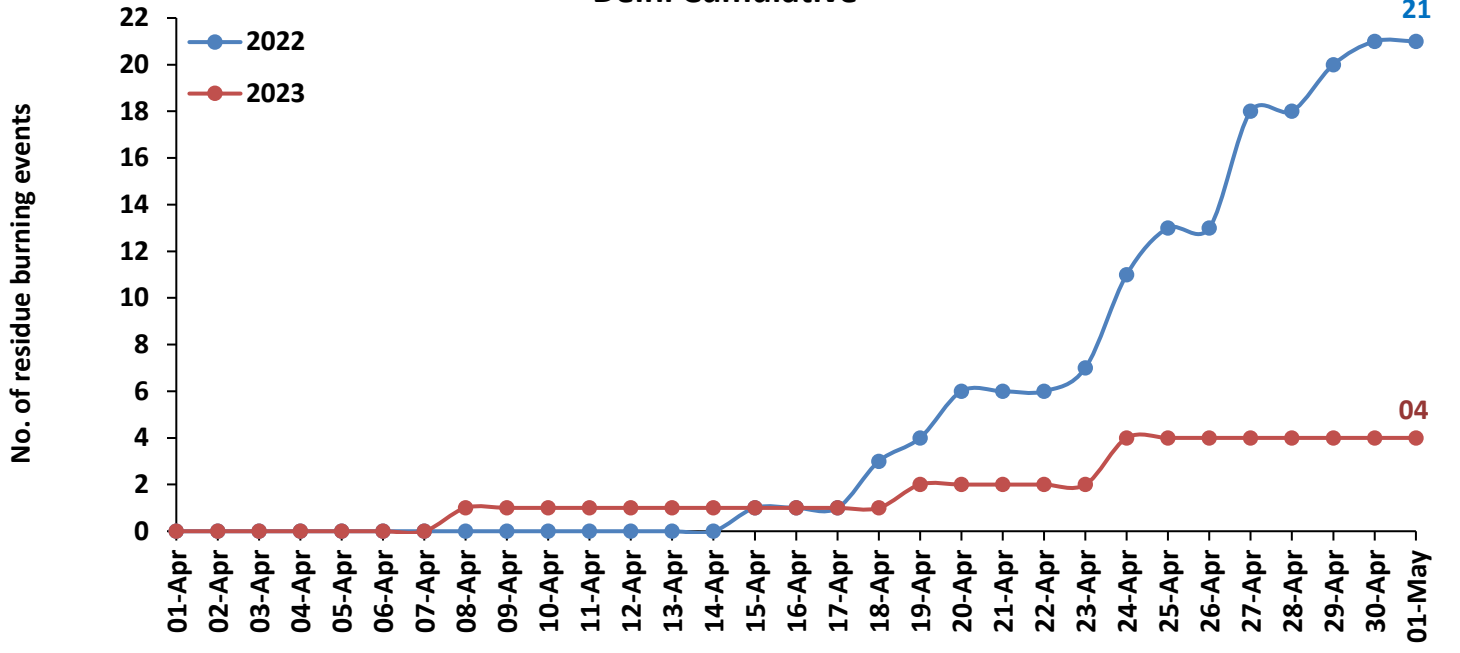


**Comparison of residue burning events in current year (2023) with previous year (2022) for the study States**





Delhi Cumulative



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

**(a) Punjab**

District	01 Apr-01 May	
	2022	2023
Amritsar	339	5
Barnala	246	20
Bathinda	378	30
Faridkot	143	5
Fatehgarh Sahib	22	1
Fazilka	292	8
Firozpur	534	6
Gurdaspur	421	9
Hoshiarpur	251	7
Jalandhar	142	8
Kapurthala	240	14
Ludhiana	220	11
Mansa	299	48
Moga	337	3
Muktsar	207	13
Pathankot	73	6
Patiala	241	17
Rupnagar	12	1
Sangrur	565	41
SAS NAGAR (Mohali)	11	1
SBS Nagar	22	2
Tarn Taran	410	2
<b>Total</b>	<b>5405</b>	<b>258</b>

**(b) Haryana**

District	01 Apr-01 May	
	2022	2023
AMBALA	70	5
BHIWANI	62	4
CHARKHI DADRI	5	2
FARIDABAD	8	8
FATEHABAD	137	13
GURGAON	6	8
HISAR	76	16
JHAJJAR	110	26
JIND	262	13
KAITHAL	221	7
KARNAL	316	14
KURUKSHETRA	113	7
MAHENDRAGARH	0	0
MEWAT	0	4
PALWAL	31	26
PANCHKULA	2	0
PANIPAT	170	12
REWARI	3	1
ROHTAK	167	12
SIRSA	94	46
SONIPAT	225	31
YAMUNANAGAR	8	8
<b>Total</b>	<b>2086</b>	<b>263</b>



(c) Uttar Pradesh

District	01 Apr-01 May							
	2022	2023						
			GAUTAMBUDHNAGAR	25	18	MUZAFARNAGAR	45	27
			GAZIPUR	71	35	PILHIBHIT	183	43
AGRA	1	0	GHAZIABAD	12	5	PRATAPGARH	17	13
ALIGARH	17	27	GONDA	18	23	RAIBEARELI	80	10
ALLAHABAD	71	20	GORAKHPUR	890	362	RAMPUR	68	16
AMBEDKARNAGAR	6	9	HAMIRPUR	8	10	SANTKABIRNAGAR	659	429
AURAIYA	46	7	HARDOI	61	20	SANTRAVIDASNAGAR	1	1
AZAMGARH	70	70	JALAUN	10	2	SHAHJAHANPUR	199	34
BADAUN	6	2	JAUNPUR	17	6	SHARANPUR	21	7
BAGHPAT	5	1	JHANSI	64	55	SHRAWASTI	72	36
BAHRAICH	89	35	JYOTIBAPHULE NAGAR	6	1	SIDDHARTHANAGAR	2481	1842
BALLIA	94	189	KANNAUJ	0	1	SITAPUR	15	12
BALRAMPUR	223	86	KANPUR	6	0	SONBHADRA	110	18
BANDA	3	1	KANPUR DEHAT	18	1	SULTANPUR	54	20
BARABANKI	5	2	KAUSHAMBI	3	3	UNNAO	33	2
BAREILLY	66	12	KHERI	126	42	VARANASI	1	0
BASTI	397	216	KUSHINAGAR	204	92	<b>Total</b>	<b>9377</b>	<b>5548</b>
BIJNOR	34	20	LACKNOW	4	0			
BULANDSAHAR	7	7	LALITPUR	31	29			
CHANDAULI	243	33	MAHAMAYANAGAR	0	1			
CHITRAKOOT	19	2	MAHARAJGANJ	1479	976			
DEORIA	696	438	MAHOBA	2	16			
ETAH	1	0	MAINPURI	1	4			
ETAWAH	3	3	MATHURA	22	44			
FAIZABAD	2	9	MAU	65	58			
FARRUKHABAD	3	2	MEERUT	9	13			
FATEHPUR	24	6	MIRZAPUR	51	10			
FIROZABAD	1	0	MORADABAD	3	14			

(d) Madhya Pradesh

District	01 Apr-01 May				
	2022	2023			
			PANNA	120	56
ALIRAJPUR	0	0	RAISEN	2474	1421
ANUPPUR	29	1	RAJGARH	100	133
ASHOKNAGAR	580	200	RATLAM	161	268
BALAGHAT	21	0	REWA	74	11
BARWANI	4	6	SAGAR	669	473
BETUL	159	40	SATNA	533	97
BHIND	42	25	SEHORE	855	609
BHOPAL	855	418	SEONI	1423	613
BURHANPUR	10	1	SHAHDOL	92	8
CHHATARPUR	101	49	SHAJAPUR	294	491
CHHINDWARA	405	191	SHEOPUR	287	344
DAMOH	182	214	SHIVPURI	139	74
DATIA	249	130	SIDHI	19	0
DEWAS	528	550	SINGRAULI	94	3
DHAR	986	865	TIKAMGARH	24	38
DINDORI	40	3	UJJAIN	1114	1654
EAST NIMAR	74	102	UMARIA	37	4
GUNA	609	339	VIDESHA	3540	1502
GWALIOR	441	216	WEST NIMAR	27	37
HARDA	364	241	<b>Total</b>	<b>24109</b>	<b>15813</b>
HOSHANGABAD	4057	2753			
INDORE	944	992			
JABALPUR	776	352			
JHABUA	2	6			
KATNI	234	64			
MANDLA	148	19			
MANDSAUR	52	83			
MORENA	3	0			
NARSHIMAPURA	124	83			
NIMACH	14	34			

**(e) Delhi**

District	01 Apr-01 May	
	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
<b>Total</b>	<b>21</b>	<b>4</b>

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

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

<b>26-Apr</b>	354	22	122	16	277	77	0	0	706	409
<b>27-Apr</b>	1064	28	436	69	436	158	5	0	955	195
<b>28-Apr</b>	965	12	453	9	249	67	0	0	849	122
<b>29-Apr</b>	802	20	345	1	213	43	2	0	340	24
<b>30-Apr</b>	662	52	357	6	166	4	1	0	547	38
<b>01-May</b>	848	3	56	0	126	32	0	0	437	8
<b>Total</b>	<b>5405</b>	<b>258</b>	<b>2086</b>	<b>263</b>	<b>9377</b>	<b>5548</b>	<b>21</b>	<b>4</b>	<b>24109</b>	<b>15813</b>

### Details of residue burning events in Punjab on 01-May-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m <sup>2</sup> )
1	FAZILKA	FAZILKA	TERRA	30.37300	74.01800	11:19:05	D	12.00
2	FAZILKA	JALALABAD	AQUA	30.46400	74.25700	13:26:01	D	27.40
3	MANSA	MANSA	S-NPP	30.06461	75.34184	12:28:08	D	5.70

### Details of wheat residue burning events in Madhya Pradesh on 01-May-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m <sup>2</sup> )
1	DAMOH	HATTA	S-NPP	24.23773	79.77676	12:28:08	D	4.80
2	DHAR	MANAWAR	S-NPP	22.26443	75.13206	02:58:26	N	1.60
3	DHAR	MANAWAR	S-NPP	22.26481	75.13010	01:18:08	N	1.40
4	RAISEN	BAGAMGANJ	S-NPP	23.67673	78.32503	12:28:08	D	6.20
5	SHEOPUR	SHEOPUR	AQUA	25.78900	76.60700	13:26:01	D	33.10
6	VIDESHA	GYARASPUR	S-NPP	23.65695	78.18958	12:28:08	D	12.00
7	VIDESHA	NATERAN	AQUA	23.92300	77.72300	13:26:01	D	22.90
8	VIDESHA	NATERAN	S-NPP	23.92098	77.73586	12:28:08	D	7.20

### Details of residue burning events in Uttar Pradesh on 01-May-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	AZAMGARH	AZAMGARH	S-NPP	25.89491	83.25552	12:28:08	D	2.00
2	AZAMGARH	MEHNAGAR	S-NPP	25.82694	83.30124	12:28:08	D	3.20
3	BALLIA	BALLIA	AQUA	25.76300	84.29100	13:26:01	D	8.50
4	BALLIA	BALLIA	AQUA	25.83400	84.06800	13:26:01	D	22.30
5	BALLIA	BALLIA	S-NPP	25.62032	83.93092	12:28:08	D	6.60
6	BALLIA	BANSDIH	S-NPP	25.89281	84.11090	12:28:08	D	5.90
7	BALLIA	BELTHARA ROAD	S-NPP	26.02331	83.88771	12:28:08	D	5.90
8	BALLIA	BELTHARA ROAD	S-NPP	26.06677	83.78146	12:28:08	D	2.90
9	BALLIA	RASRA	S-NPP	25.95502	83.96254	12:28:08	D	11.70
10	BALLIA	RASRA	S-NPP	25.95982	83.96128	12:28:08	D	6.80
11	BALLIA	SIKANDARPUR	S-NPP	26.01504	83.98953	12:28:08	D	3.80
12	CHANDAULI	CHAKIA	S-NPP	25.10187	83.25203	12:28:08	D	2.80
13	CHANDAULI	CHAKIA	S-NPP	25.13258	83.26878	12:28:08	D	7.40
14	CHANDAULI	CHAKIA	S-NPP	25.14904	83.19652	12:28:08	D	2.00
15	CHANDAULI	CHANDAULI	S-NPP	25.24466	83.32986	12:28:08	D	5.10
16	CHANDAULI	CHANDAULI	S-NPP	25.27366	83.38848	12:28:08	D	3.00
17	CHANDAULI	CHANDAULI	S-NPP	25.33259	83.41444	12:28:08	D	1.60
18	CHANDAULI	CHANDAULI	S-NPP	25.33467	83.41419	12:28:08	D	2.20
19	CHANDAULI	CHANDAULI	S-NPP	25.35976	83.38341	12:28:08	D	1.60
20	GAZIPUR	GAZIPUR	S-NPP	25.70470	83.52908	12:28:08	D	1.60
21	GAZIPUR	JAKHANIA	AQUA	25.69000	83.51500	13:26:01	D	9.30
22	GAZIPUR	JAKHANIA	S-NPP	25.70417	83.40778	12:28:08	D	2.30
23	GAZIPUR	MUHAMMADBAD	S-NPP	25.69695	83.94685	12:28:08	D	3.10
24	GAZIPUR	MUHAMMADBAD	S-NPP	25.70048	83.93961	12:28:08	D	3.10
25	MAU	MAU	S-NPP	25.89243	83.60155	12:28:08	D	3.30
26	MAU	MAU	S-NPP	25.95837	83.77813	12:28:08	D	7.00
27	MAU	MAU	S-NPP	25.96135	83.77785	12:28:08	D	6.90
28	MIRZAPUR	CHUNAR	S-NPP	25.17741	83.17374	12:28:08	D	13.60
29	MIRZAPUR	CHUNAR	S-NPP	25.17818	83.17713	12:28:08	D	13.80
30	MIRZAPUR	MARIHAN	S-NPP	24.91087	82.73866	12:28:08	D	4.50
31	SANTKABIRNAGAR	KHALILABAD	S-NPP	26.79873	82.98527	12:28:08	D	4.70
32	SANTKABIRNAGAR	MEHDawal	S-NPP	27.05388	83.14460	12:28:08	D	6.60

**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 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)

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