

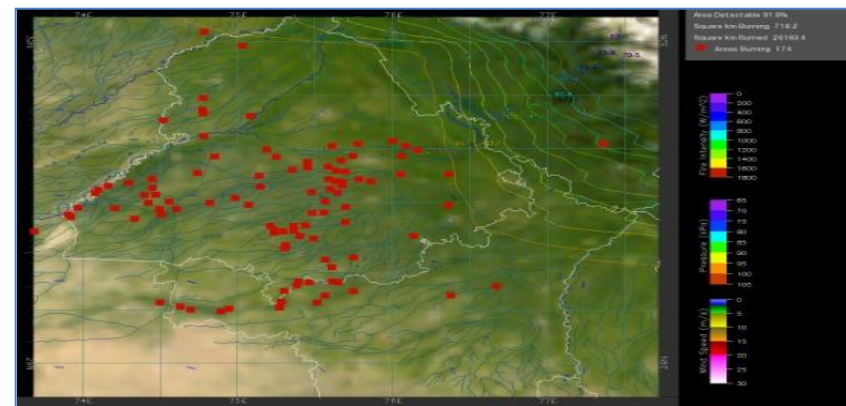
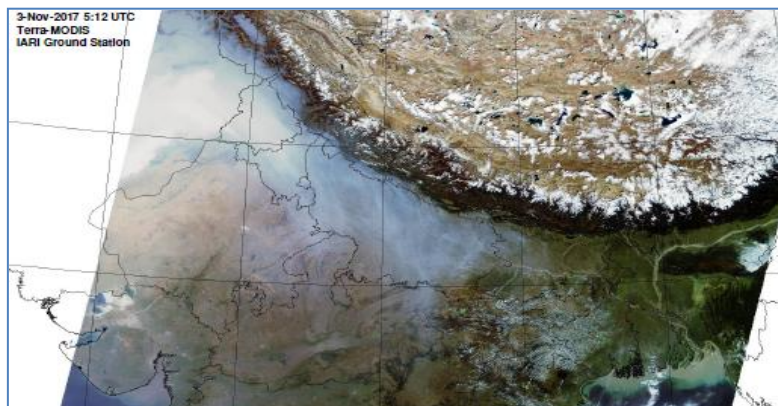


MONITORING PADDY RESIDUE BURNING IN INDIA USING SATELLITE REMOTE SENSING DURING 2023

Bulletin
No. 10

Events Date:
24-Sep-2023

Issued on:
24-Sep-2023



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

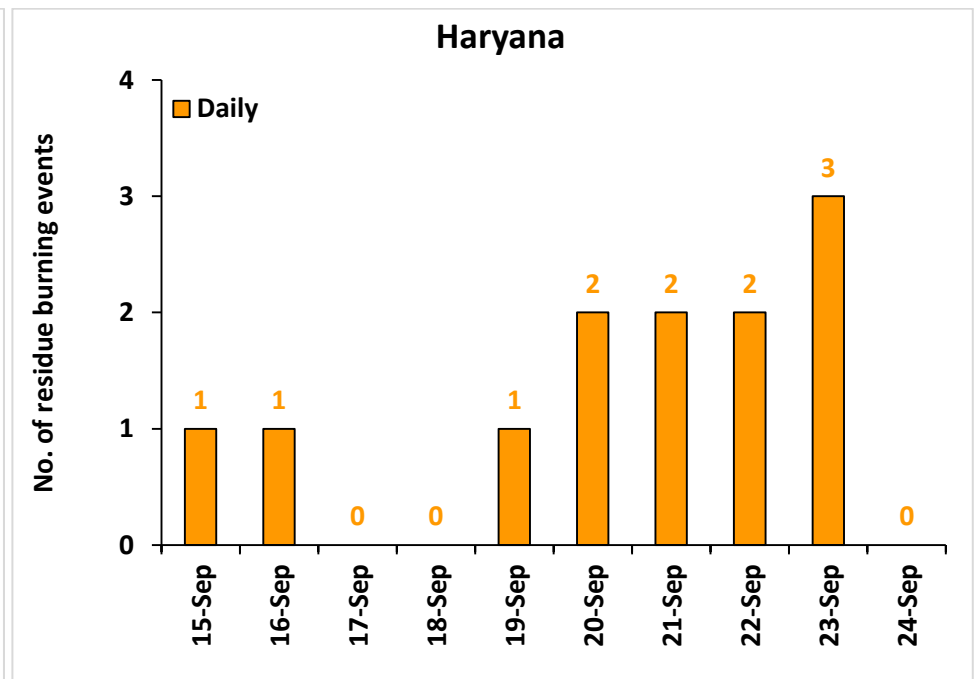
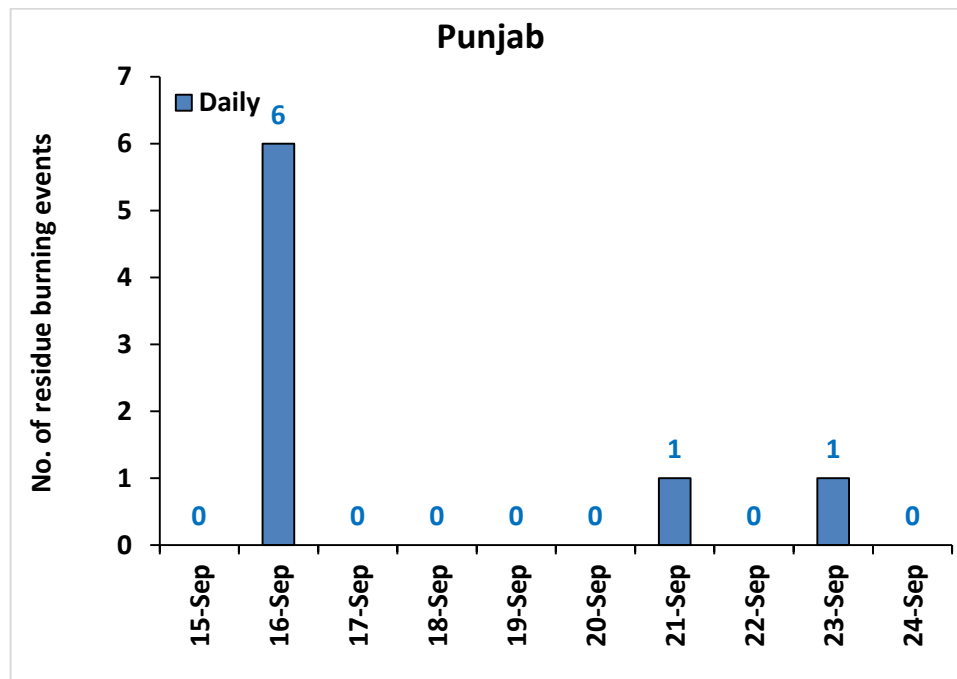
<http://creams.iari.res.in>



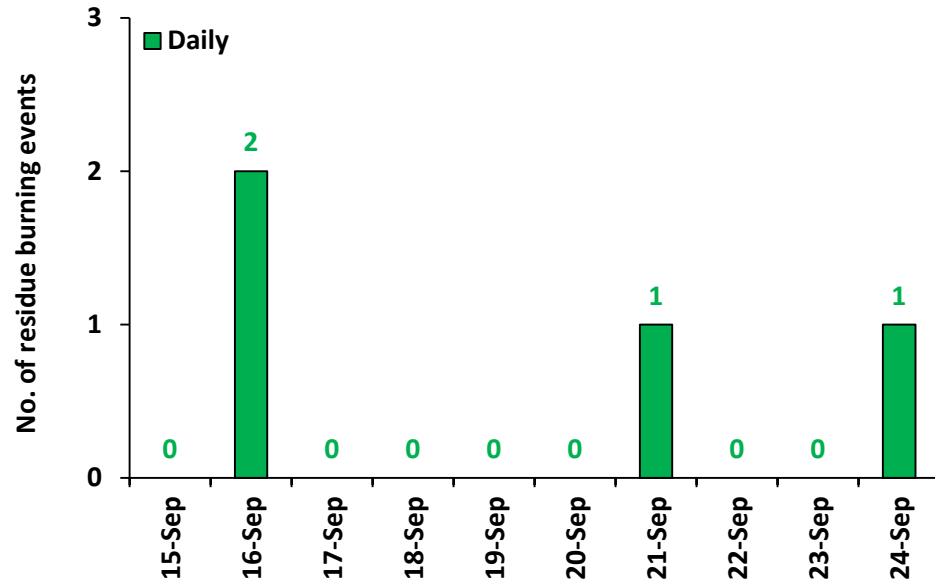
Highlights for 24-Sep-2023

- 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 **01** residue burning events in the six study States on 24-Sep-2023.
- The state wise events detected on 24-Sep-2023 were **00** in Punjab, **00** in Haryana, **01** in UP, **00** in Delhi, **01** in Rajasthan and **00** in MP.
- Total **26** burning events were detected in the six states between 15-Sept-2023 and 24-Sep-2023, which are distributed as **08**, **12**, **04**, **00**, **00** and **02** in Punjab, Haryana, UP, Delhi, Rajasthan and MP, respectively.
- Detection of residue burning events was hampered by the presence of clouds over Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan and Madhya Pradesh states.

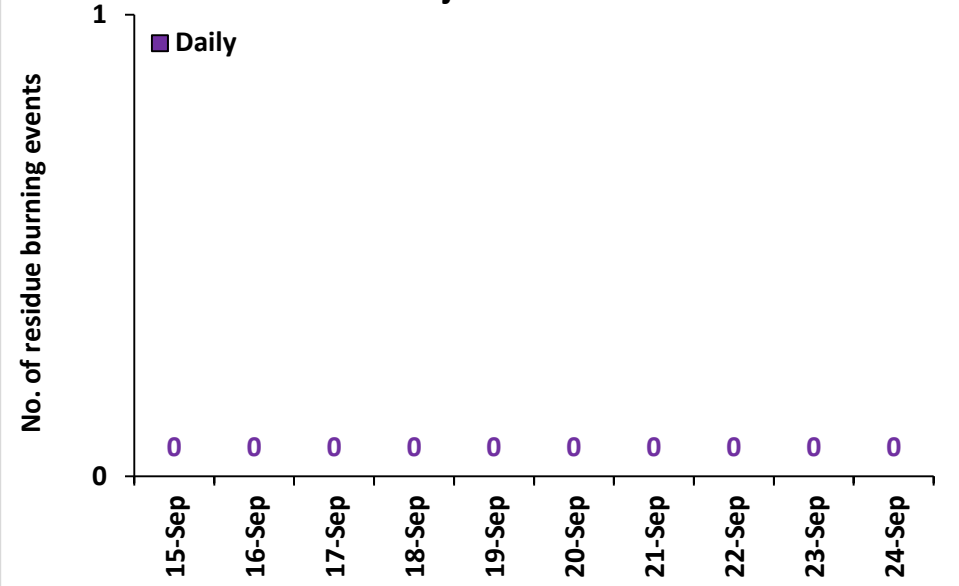
Temporal distribution of rice residue burning events for the study States in 2023



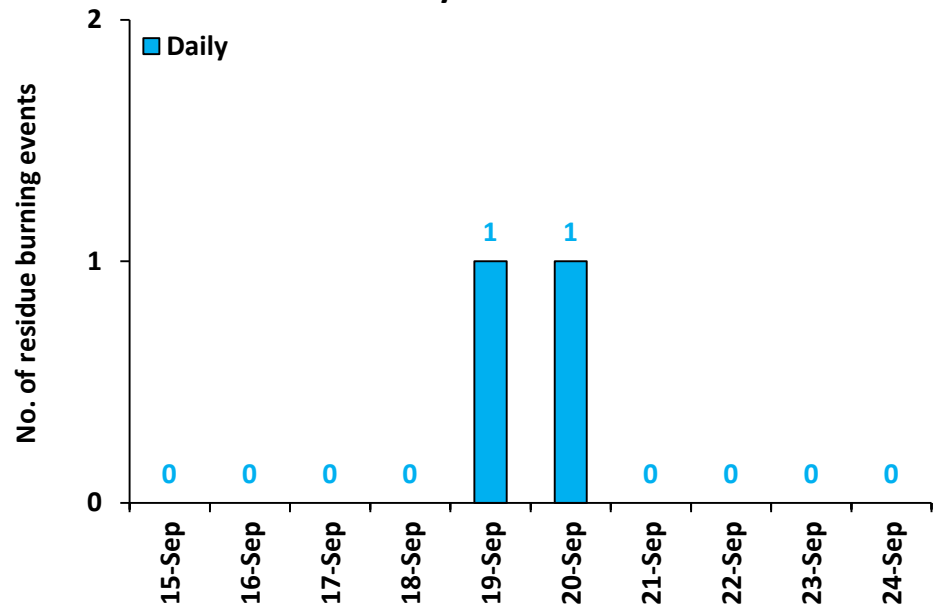
Uttar Pradesh



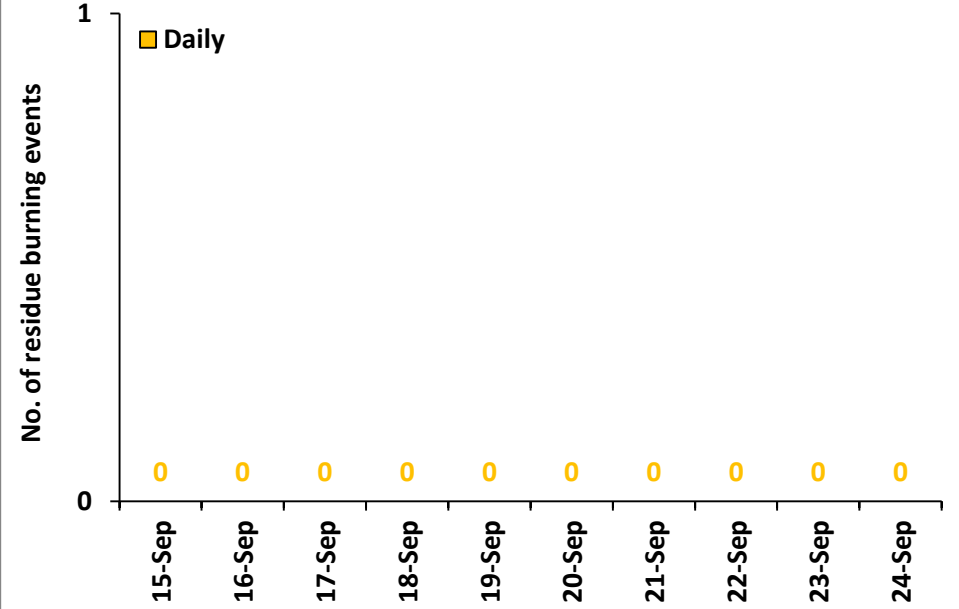
Rajasthan



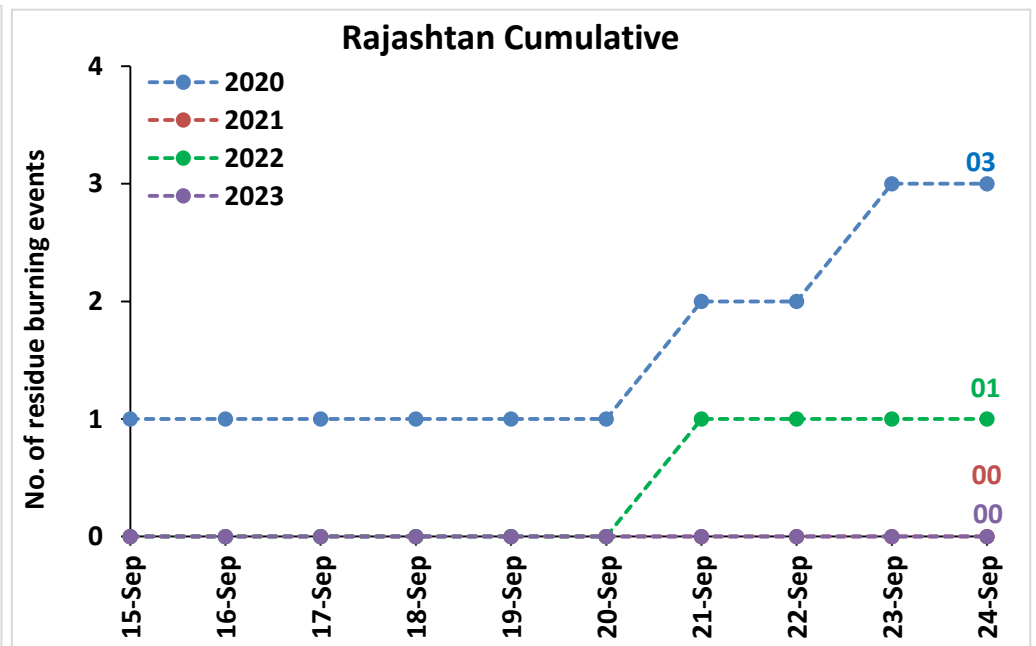
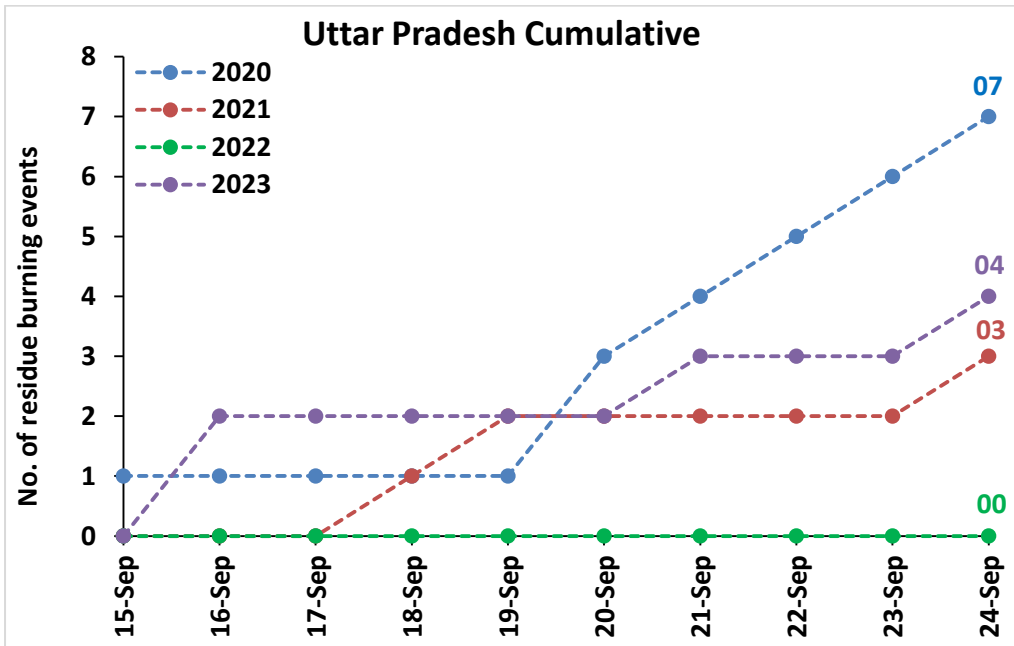
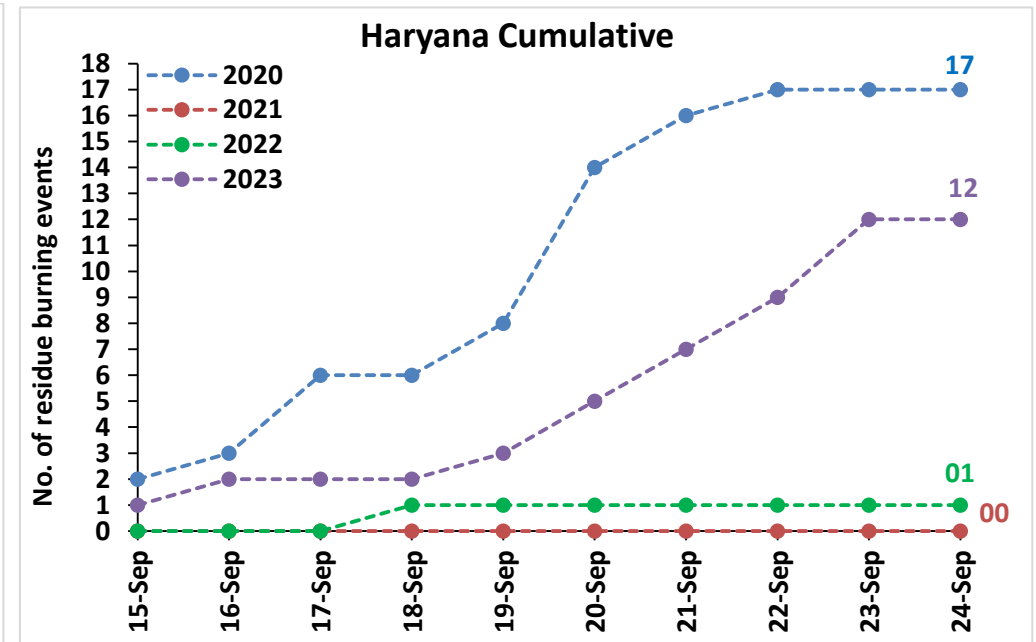
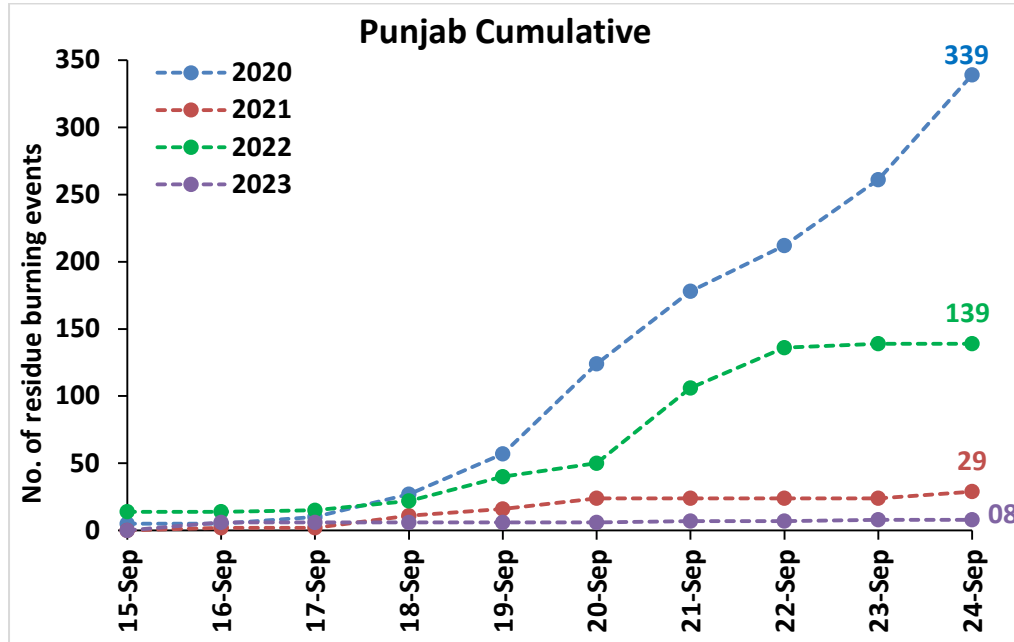
Madhya Pradesh

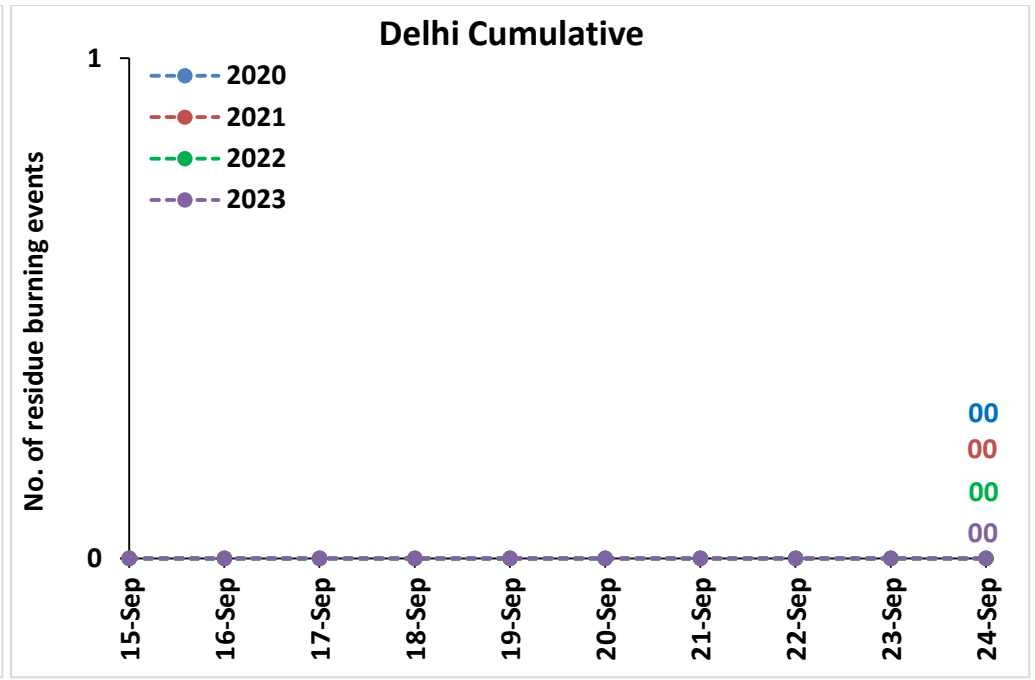
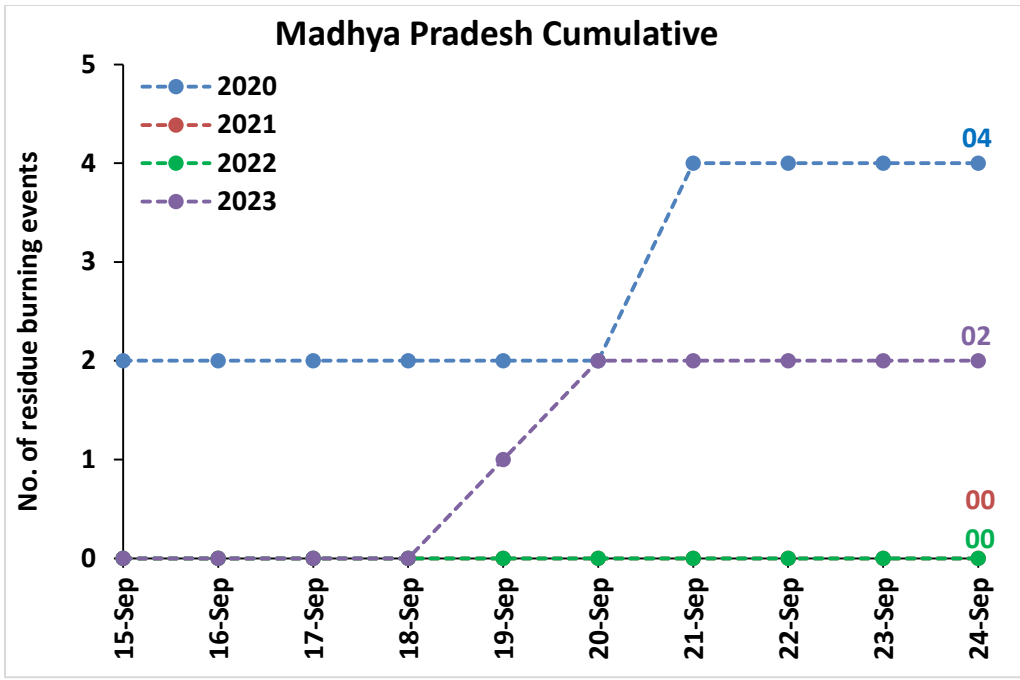


Delhi

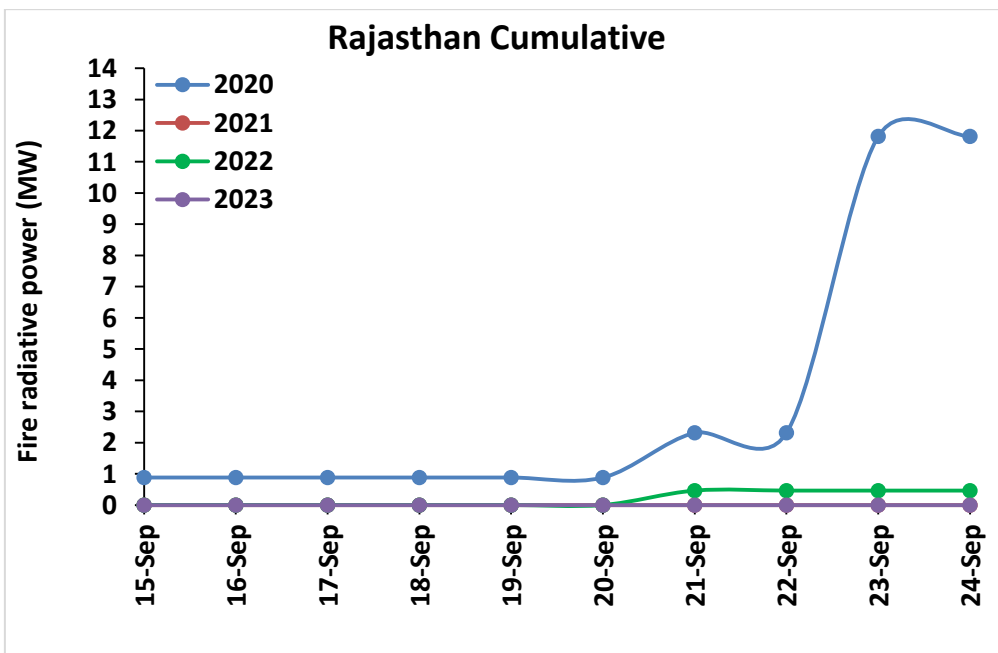
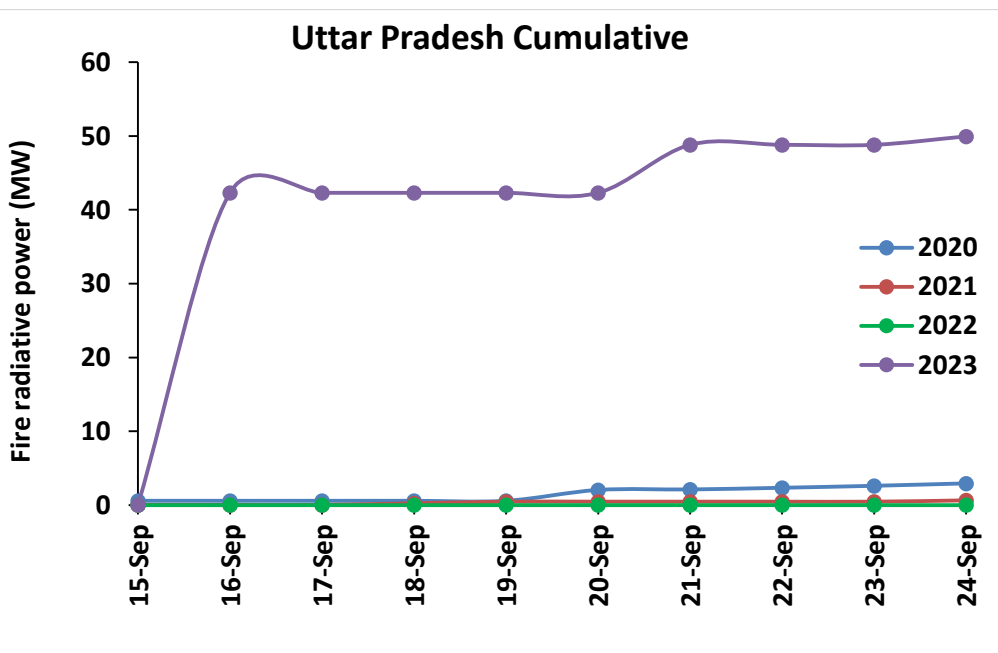
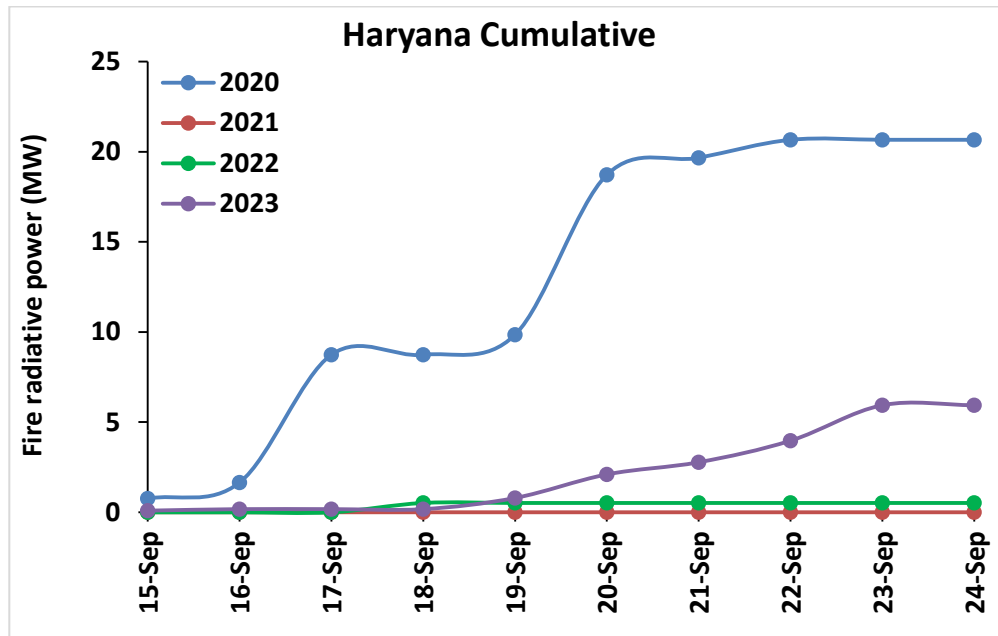
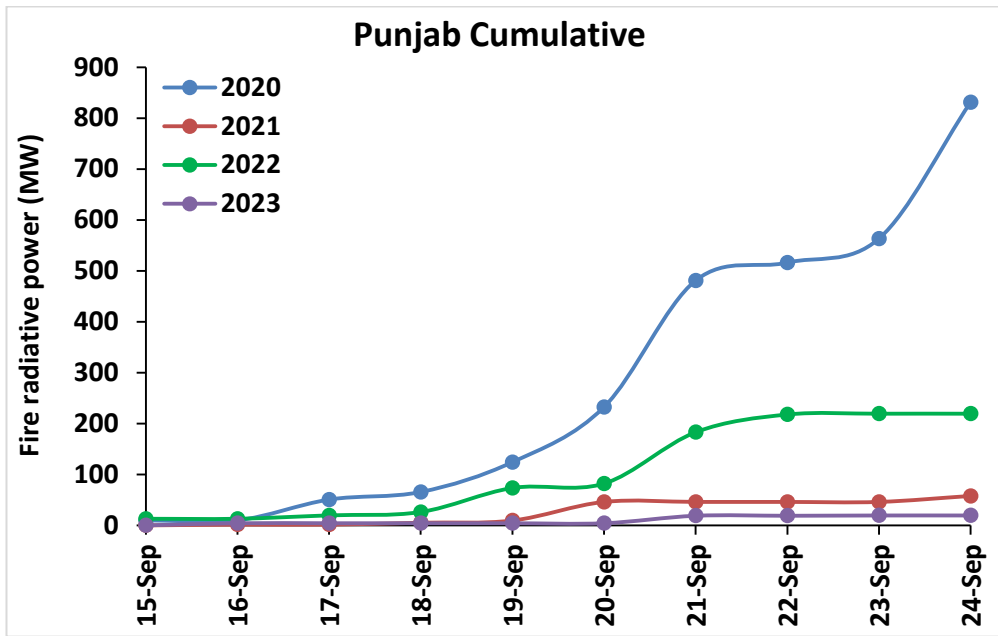


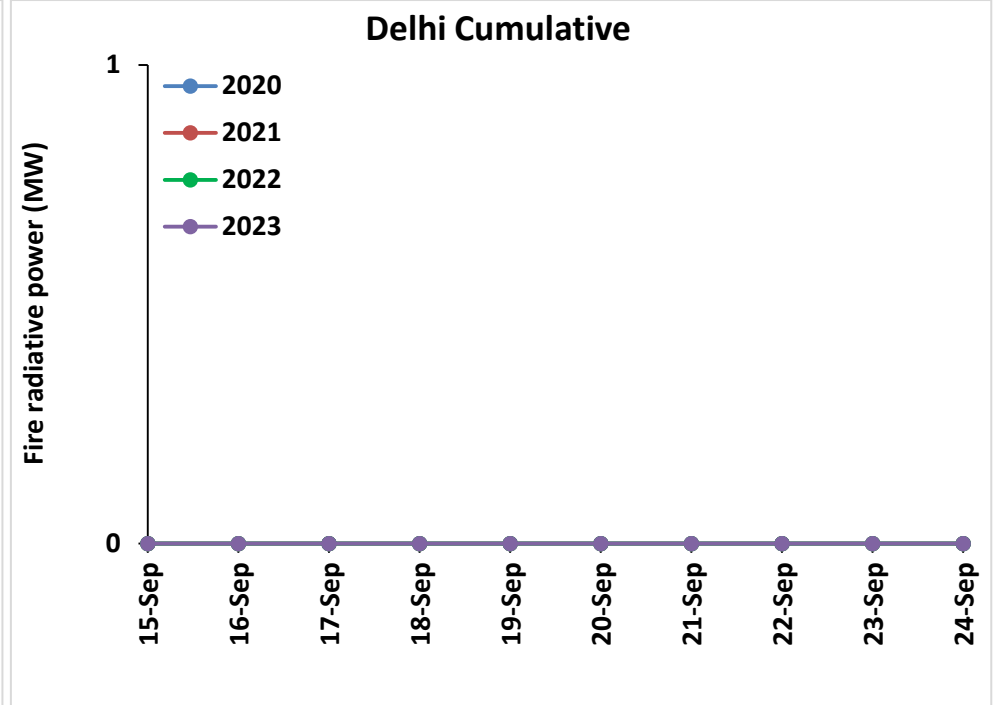
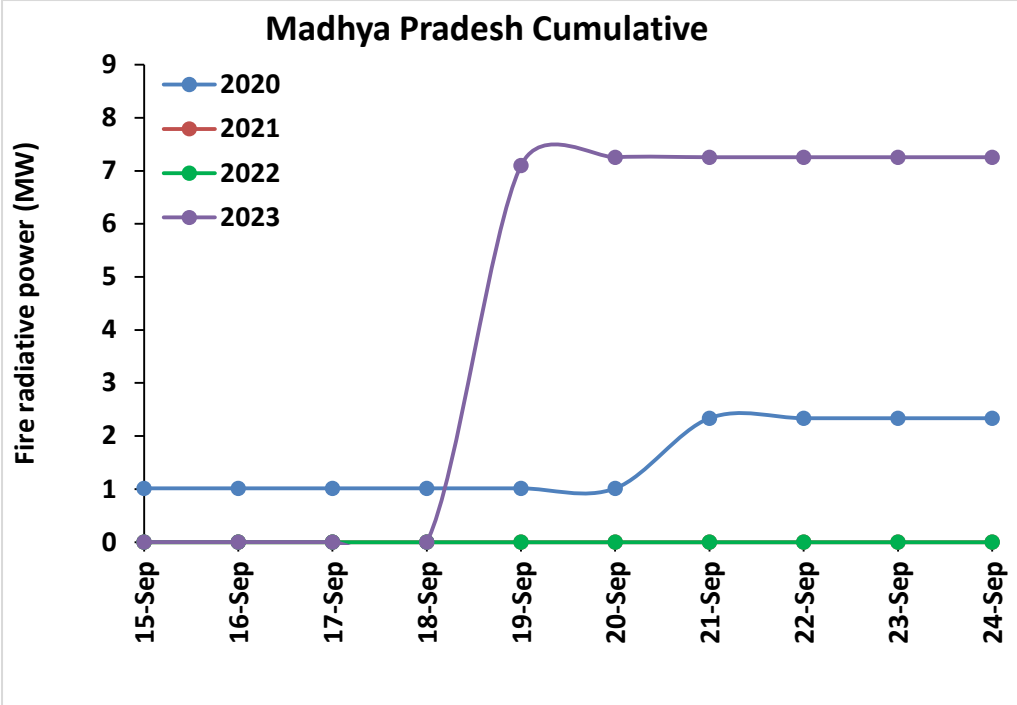
Comparison of residue burning events in current year (2023) with previous years (2020, 2021 and 2022) for the study State





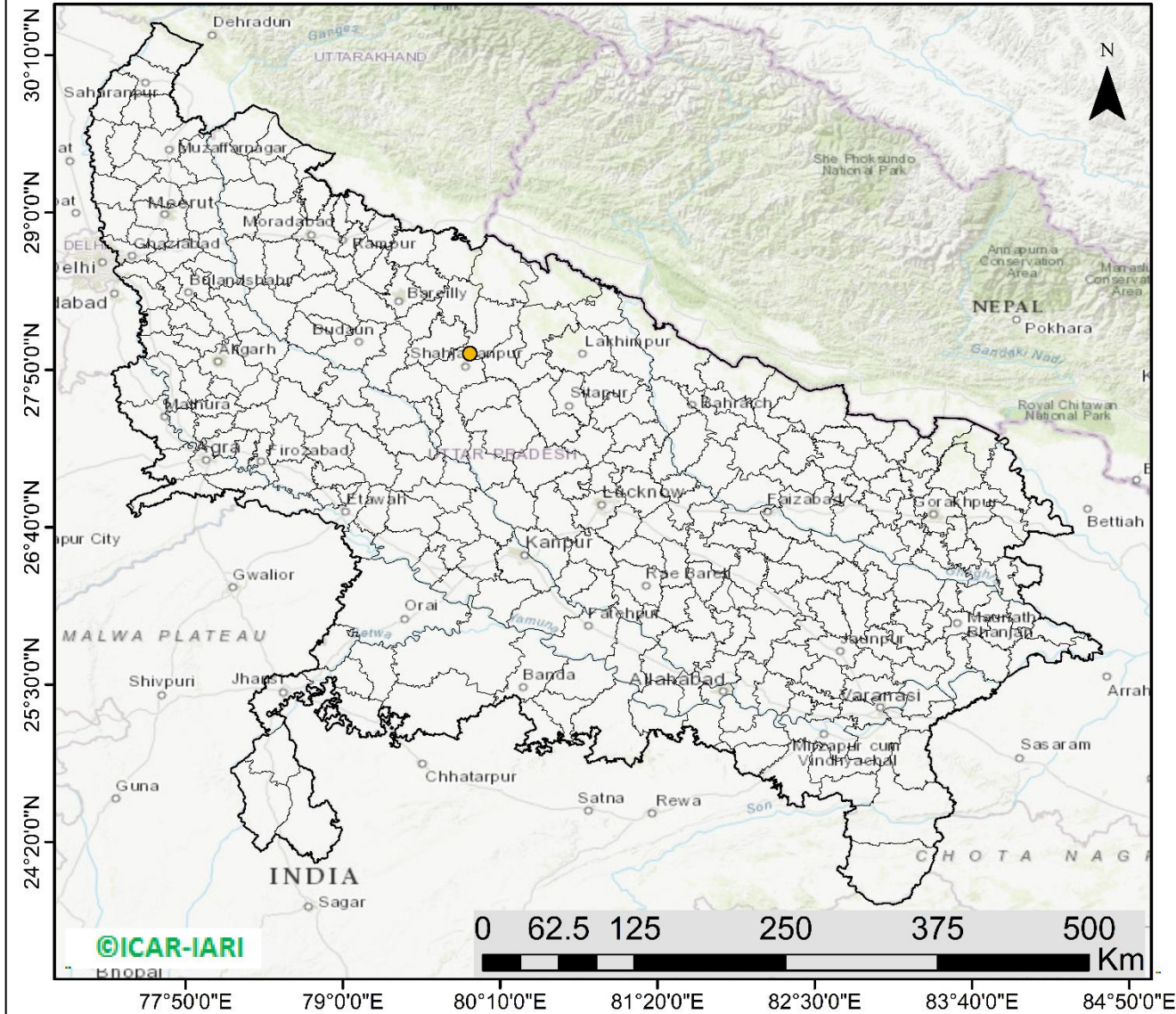
Comparison of residue burning fire power in current year (2023) with previous years (2020, 2021 and 2022) for the study States





Uttar Pradesh

RICE RESIDUE BURNING IN UTTAR PRADESH



01 burning events detected in Uttar Pradesh on (24th Sep 2023)

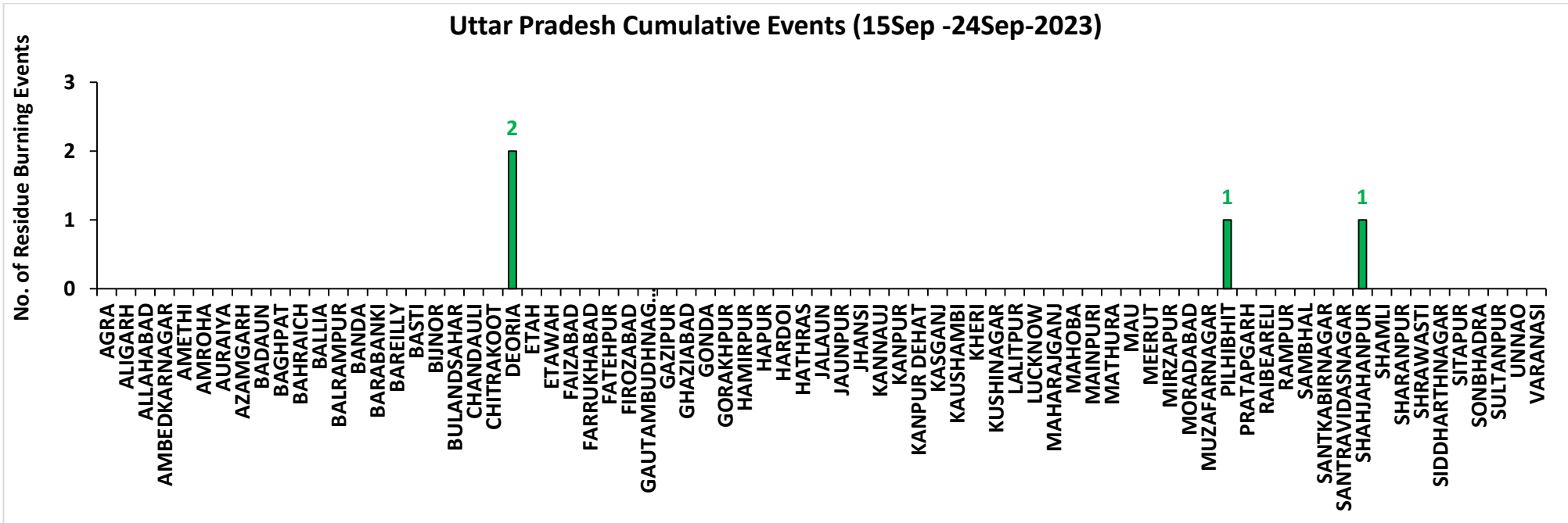
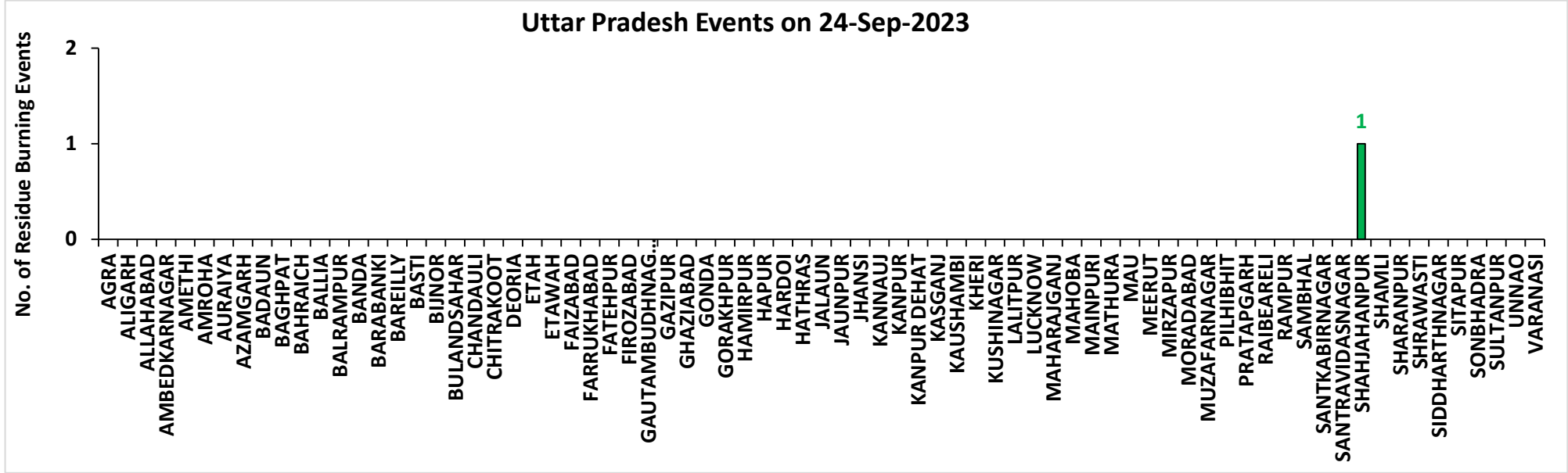
Fire Intensity (W/m²)

- 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-24Sep-2023)



District-wise cumulative number of residues burning events detected in 2020, 2021, 2022 and 2023
(Period: 15 September-24 September)

(a) Punjab

District	15 Sep-24 Sep			
	2020	2021	2022	2023
Amritsar	299	23	121	6
Barnala	1	0	0	0
Bathinda	0	0	0	0
Faridkot	0	1	0	0
Fatehgarh Sahib	0	0	0	0
Fazilka	0	0	0	0
Firozpur	0	0	0	1
Gurdaspur	1	0	1	0
Hoshiarpur	0	0	0	1
Jalandhar	0	0	0	0
Kapurthala	2	0	0	0
Ludhiana	3	1	0	0
Mansa	1	0	0	0
Moga	2	0	0	0
Muktsar	1	0	0	0
Pathankot	0	0	0	0
Patiala	1	3	1	0
Rupnagar	0	0	0	0
Sangrur	0	0	0	0
SAS NAGAR (Mohali)	3	0	1	0
SBS Nagar	0	0	1	0
Tarn Taran	25	1	14	0
Total	339	29	139	8

(b) Haryana

District	15 Sep-24 Sep			
	2020	2021	2022	2023
AMBALA	3	0	0	0
BHIWANI	0	0	0	0
CHARKHI DADRI	0	0	0	0
FARIDABAD	0	0	0	0
FATEHABAD	1	0	0	1
GURGAON	0	0	0	0
HISAR	0	0	0	0
JHAJJAR	0	0	0	0
JIND	0	0	1	1
KAITHAL	0	0	0	0
KARNAL	9	0	0	5
KURUKSHETRA	2	0	0	1
MAHENDRAGARH	0	0	0	0
MEWAT	0	0	0	0
PALWAL	0	0	0	0
PANCHKULA	0	0	0	0
PANIPAT	1	0	0	0
REWARI	0	0	0	0
ROHTAK	0	0	0	1
SIRSA	1	0	0	0
SONIPAT	0	0	0	2
YAMUNANAGAR	0	0	0	1
Total	17	0	1	12

(c) Uttar Pradesh

District	15 Sep-24 Sep													
	2020	2021	2022	2023	GAUTAMBUDHNAGAR	0	0	0	0	MUZAFARNAGAR	0	0	0	0
AGRA	0	0	0	0	GAZIPUR	0	0	0	0	PILHIBHIT	0	0	0	1
ALIGARH	0	0	0	0	GHAZIABAD	0	0	0	0	PRATAPGARH	0	0	0	0
ALLAHABAD	0	0	0	0	GONDA	0	0	0	0	RAIBEARELI	1	0	0	0
AMBEDKARNAGAR	0	0	0	0	GORAKHPUR	0	0	0	0	RAMPUR	0	1	0	0
AMETHI	0	0	0	0	HAMIRPUR	0	0	0	0	SAMBHAL	1	0	0	0
AMROHA	0	0	0	0	HAPUR	1	0	0	0	SANTKABIRNAGAR	0	0	0	0
AURAIYA	1	0	0	0	HARDOI	0	0	0	0	SANTRAVIDASNAGAR	0	0	0	0
AZAMGARH	0	0	0	0	HATHRAS	0	0	0	0	SHAHJAHANPUR	0	0	0	1
BADAUN	0	0	0	0	JALAUN	0	0	0	0	SHAMLI	1	0	0	0
BAGHPAT	1	0	0	0	JAUNPUR	0	0	0	0	SHARANPUR	0	0	0	0
BAHRAICH	0	0	0	0	JHANSI	0	0	0	0	SHRAWASTI	0	0	0	0
BALLIA	0	0	0	0	KANNAUJ	0	0	0	0	SIDDHARTHANAGAR	0	0	0	0
BALRAMPUR	0	0	0	0	KANPUR	0	1	0	0	SITAPUR	0	0	0	0
BANDA	0	0	0	0	KANPUR DEHAT	0	0	0	0	SONBHADRA	0	0	0	0
BARABANKI	0	0	0	0	KASGANJ	0	0	0	0	SULTANPUR	0	0	0	0
BAREILLY	0	0	0	0	KAUSHAMBI	0	0	0	0	UNNAO	0	0	0	0
BASTI	0	0	0	0	KHERI	0	0	0	0	VARANASI	0	0	0	0
BIJNOR	1	0	0	0	KUSHINAGAR	0	0	0	0	Total	7	3	0	4
BULANDSAHAR	0	0	0	0	LALITPUR	0	0	0	0					
CHANDAUJI	0	0	0	0	LUCKNOW	0	0	0	0					
CHITRAKOOT	0	0	0	0	MAHARAJGANJ	0	0	0	0					
DEORIA	0	0	0	2	MAHOBA	0	0	0	0					
ETAH	0	0	0	0	MAINPURI	0	0	0	0					
ETAWAH	0	0	0	0	MATHURA	0	1	0	0					
FAIZABAD	0	0	0	0	MAU	0	0	0	0					
FARRUKHABAD	0	0	0	0	MEERUT	0	0	0	0					
FATEHPUR	0	0	0	0	MIRZAPUR	0	0	0	0					
FIROZABAD	0	0	0	0	MORADABAD	0	0	0	0					

(d) Delhi

District	15 Sep-24 Sep			
	2020	2021	2022	2023
CENTRAL	0	0	0	0
EAST	0	0	0	0
NEW DELHI	0	0	0	0
NORTH	0	0	0	0
NORTH EAST	0	0	0	0
NORTH WEST DELHI	0	0	0	0
SHAHADRA	0	0	0	0
SOUTH	0	0	0	0
SOUTH EAST	0	0	0	0
SOUTH WEST DELHI	0	0	0	0
WEST DELHI	0	0	0	0
Total	0	0	0	0

(e) Rajasthan

District	15 Sep-24 Sep			
	2020	2021	2022	2023
AJMER	0	0	0	0
ALWAR	0	0	0	0
BANSWARA	0	0	0	0
BARAN	0	0	0	0
BARMER	1	0	0	0
BHARATPUR	0	0	0	0
BHILWARA	1	0	0	0
BIKANER	0	0	0	0
BUNDI	0	0	1	0
CHITTAURGARH	0	0	0	0
CHURU	0	0	0	0
DAUSA	0	0	0	0
DHOLPUR	0	0	0	0
DUNGARPUR	0	0	0	0
GANGANAGAR	0	0	0	0
HANUMANGARH	0	0	0	0
JAIPUR	0	0	0	0
JAISELMER	1	0	0	0
JALOR	0	0	0	0
JHALAWAR	0	0	0	0
JHUNJHUNUN	0	0	0	0
JODHPUR	0	0	0	0
KARAULI	0	0	0	0
KOTA	0	0	0	0
NAGAU	0	0	0	0
PALI	0	0	0	0
PRATAPGARH	0	0	0	0
RAJSMAND	0	0	0	0
SIKAR	0	0	0	0
SIROHI	0	0	0	0
SWAIMADHOPUR	0	0	0	0
TONK	0	0	0	0
UDAIPUR	0	0	0	0
Total	3	0	1	0

(f) Madhya Pradesh

District	15 Sep-24 Sep								
	2020	2021	2022	2023					
					PANNA	0	0	0	0
ALIRAJPUR	0	0	0	0	RAISEN	0	0	0	0
ANUPPUR	0	0	0	0	RAJGARH	0	0	0	0
ASHOKNAGAR	0	0	0	0	RATLAM	0	0	0	0
BALAGHAT	0	0	0	0	REWA	0	0	0	0
BARWANI	0	0	0	0	SAGAR	2	0	0	0
BETUL	0	0	0	0	SATNA	0	0	0	0
BHIND	0	0	0	0	SEHORE	0	0	0	0
BHOPAL	0	0	0	0	SEONI	0	0	0	0
BURHANPUR	0	0	0	0	SHAHDOL	0	0	0	0
CHHATARPUR	0	0	0	0	SHAJAPUR	0	0	0	0
CHHINDWARA	0	0	0	0	SHEOPUR	0	0	0	0
DAMOH	0	0	0	1	SHIVPURI	0	0	0	0
DATIA	0	0	0	0	SIDHI	0	0	0	0
DEWAS	0	0	0	0	SINGRAULI	0	0	0	0
DHAR	0	0	0	0	TIKAMGARH	0	0	0	0
DINDORI	0	0	0	0	UJJAIN	0	0	0	0
EAST NIMAR	0	0	0	0	UMARIA	0	0	0	0
GUNA	0	0	0	0	VIDESHA	0	0	0	0
GWALIOR	0	0	0	0	WEST NIMAR	0	0	0	0
HARDA	2	0	0	0	Total	4	0	0	2
HOSHANGABAD	0	0	0	1					
INDORE	0	0	0	0					
JABALPUR	0	0	0	0					
JHABUA	0	0	0	0					
KATNI	0	0	0	0					
MANDLA	0	0	0	0					
MANDSAUR	0	0	0	0					
MORENA	0	0	0	0					
NARSHIMAPURA	0	0	0	0					
NIMACH	0	0	0	0					

State-wise and date-wise number of paddy residue burning events detected in 2020 ,2021 ,2022 and 2023
(Period: 15 September-24 September)

Number of Paddy Residue Burning Events Detected

Date	Punjab				Haryana				Uttar Pradesh			
	2020	2021	2022	2023	2020	2021	2022	2023	2020	2021	2022	2023
15-Sep	5	0	14	0	2	0	0	1	1	0	0	0
16-Sep	0	2	0	6	1	0	0	1	0	0	0	2
17-Sep	5	0	1	0	3	0	0	0	0	0	0	0
18-Sep	17	9	7	0	0	0	1	0	0	1	0	0
19-Sep	30	5	18	0	2	0	0	1	0	1	0	0
20-Sep	67	8	10	0	6	0	0	2	2	0	0	0
21-Sep	54	0	56	1	2	0	0	2	1	0	0	1
22-Sep	34	0	30	0	1	0	0	2	1	0	0	0
23-Sep	49	0	3	1	0	0	0	3	1	0	0	0
24-Sep	78	5	0	0	0	0	0	0	1	1	0	1
Total	339	29	139	8	17	0	1	12	7	3	0	4

Number of Paddy Residue Burning Events Detected

Date	Delhi				Rajasthan				Madhya Pradesh			
	2020	2021	2022	2023	2020	2021	2022	2023	2020	2021	2022	2023
15-Sep	0	0	0	0	1	0	0	0	2	0	0	0
16-Sep	0	0	0	0	0	0	0	0	0	0	0	0
17-Sep	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep	0	0	0	0	0	0	0	0	0	0	0	0
19-Sep	0	0	0	0	0	0	0	0	0	0	0	1
20-Sep	0	0	0	0	0	0	0	0	0	0	0	1
21-Sep	0	0	0	0	1	0	1	0	2	0	0	0
22-Sep	0	0	0	0	0	0	0	0	0	0	0	0
23-Sep	0	0	0	0	1	0	0	0	0	0	0	0
24-Sep	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	3	0	1	0	4	0	0	2

Details of residue burning events in Uttar Pradesh on 24-Sep-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	SHAHJAHANPUR	SHAHJAHANPUR	S-NPP	27.95245	79.94257	13:29:50	D	8.10

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 (ISRO)**

Study Team

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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)
