

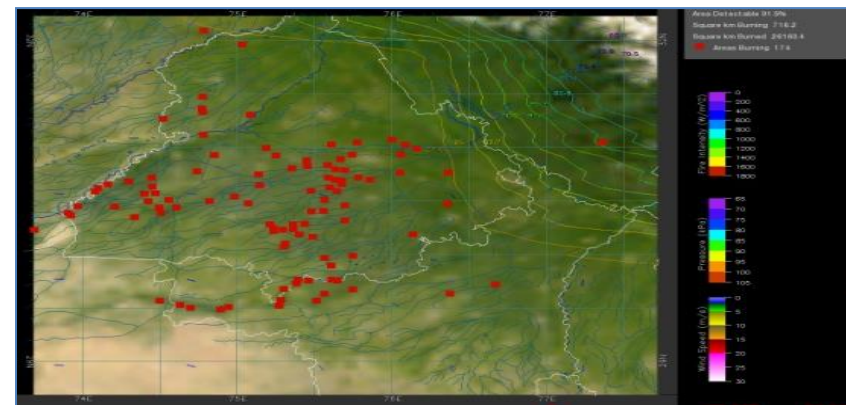
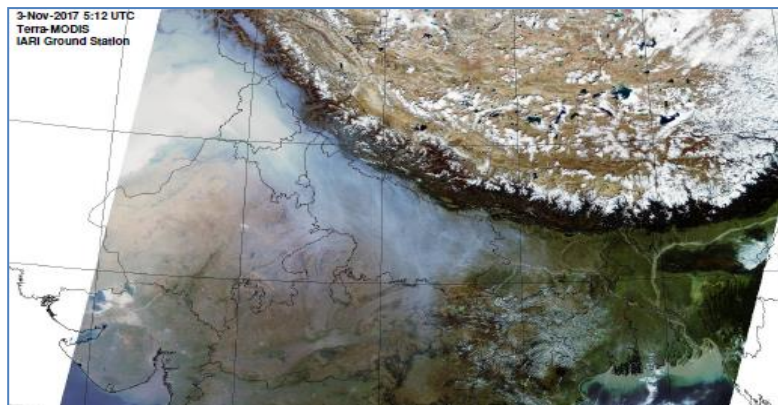


MONITORING PADDY RESIDUE BURNING IN INDIA USING SATELLITE REMOTE SENSING DURING 2023

**Bulletin
No. 07**

**Events Date:
21-Sep-2023**

**Issued on:
21-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

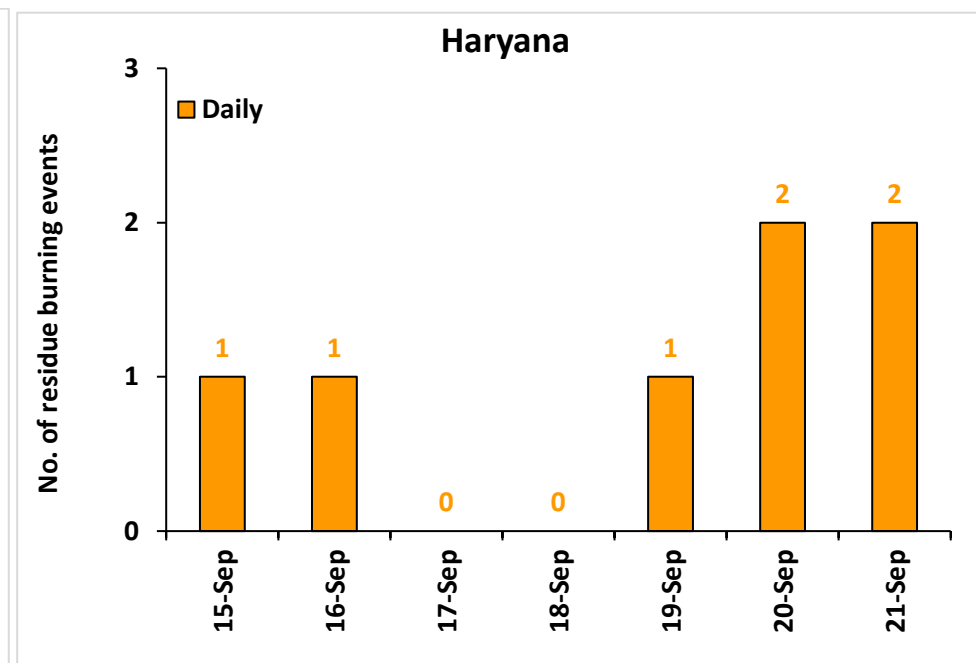
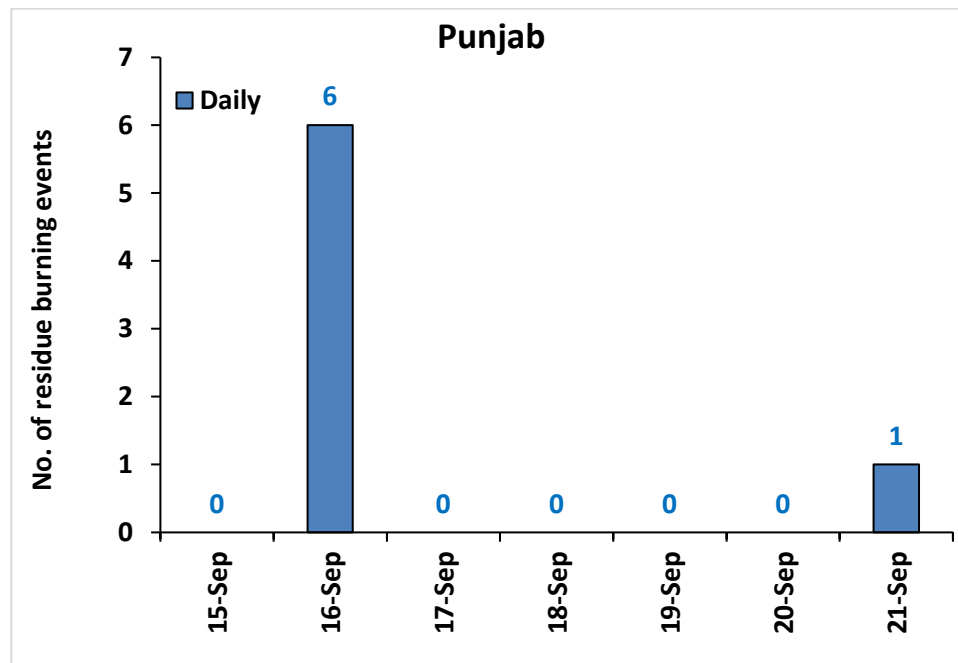
<http://creams.iari.res.in>



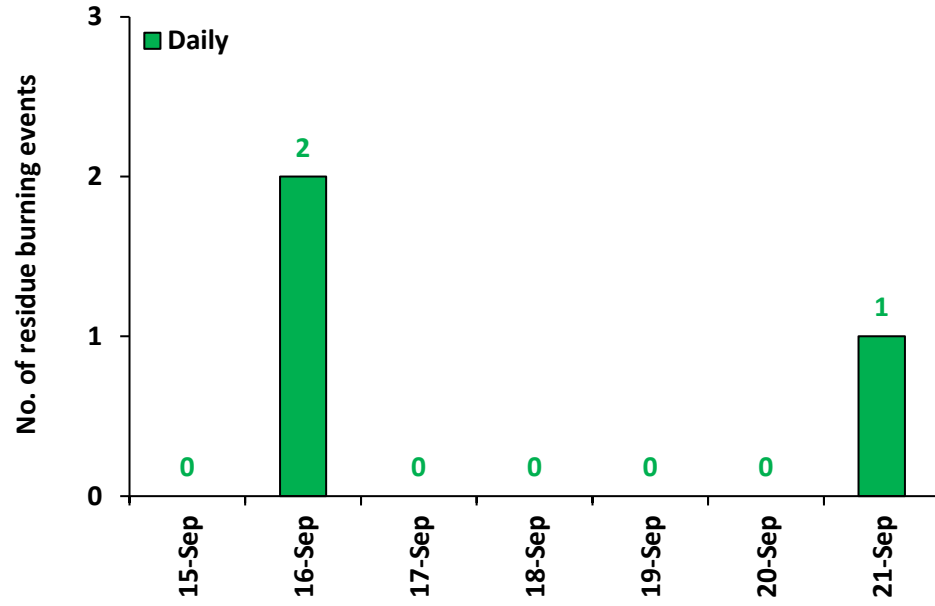
Highlights for 21-Sep-2023

- 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 **04** residue burning events in the six study States on 21-Sep-2023.
- The state wise events detected on 21-Sep-2023 were **01** in Punjab, **02** in Haryana, **01** in UP, **00** in Delhi, **00** in Rajasthan and **00** in MP.
- Total **19** burning events were detected in the six states between 15-Sept-2023 and 21-Sep-2023, which are distributed as **07, 07, 03, 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 Rajasthan, Uttar Pradesh, and Madhya Pradesh states.

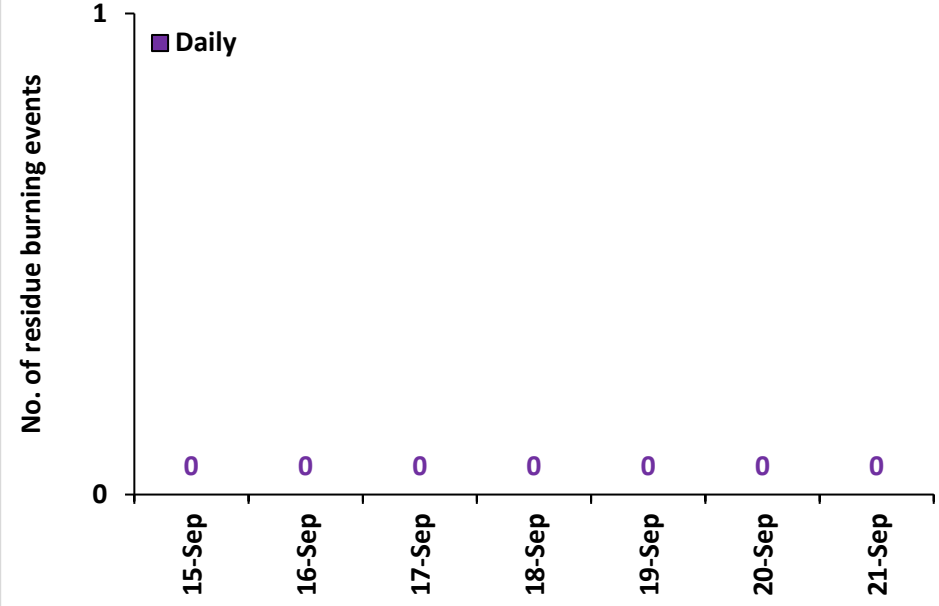
Temporal distribution of rice residue burning events for the study States in 2023



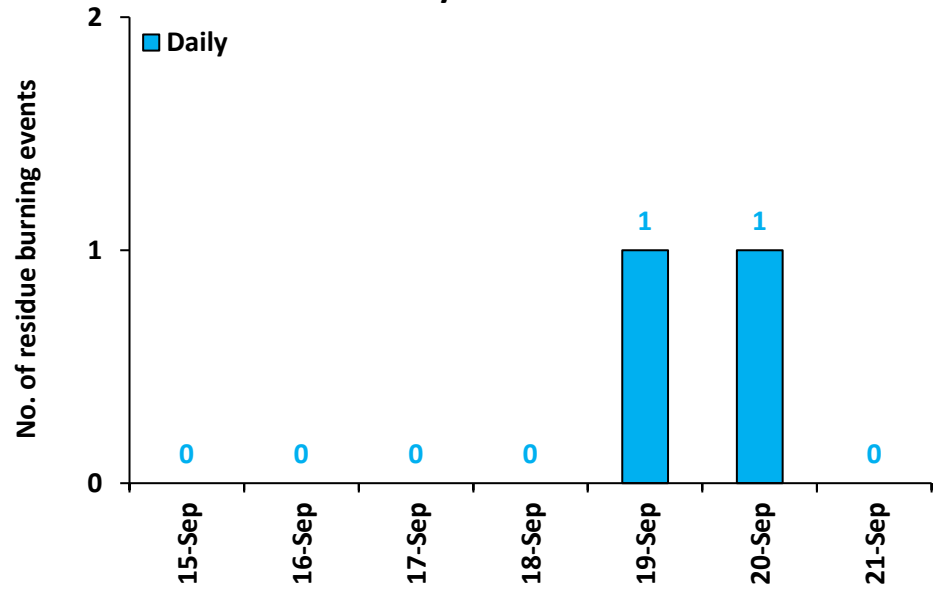
Uttar Pradesh



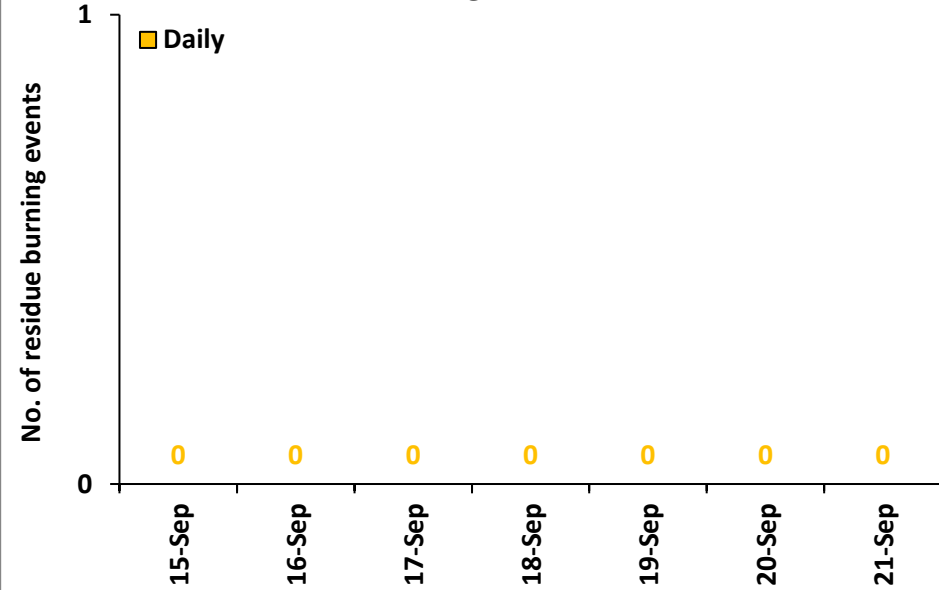
Rajasthan



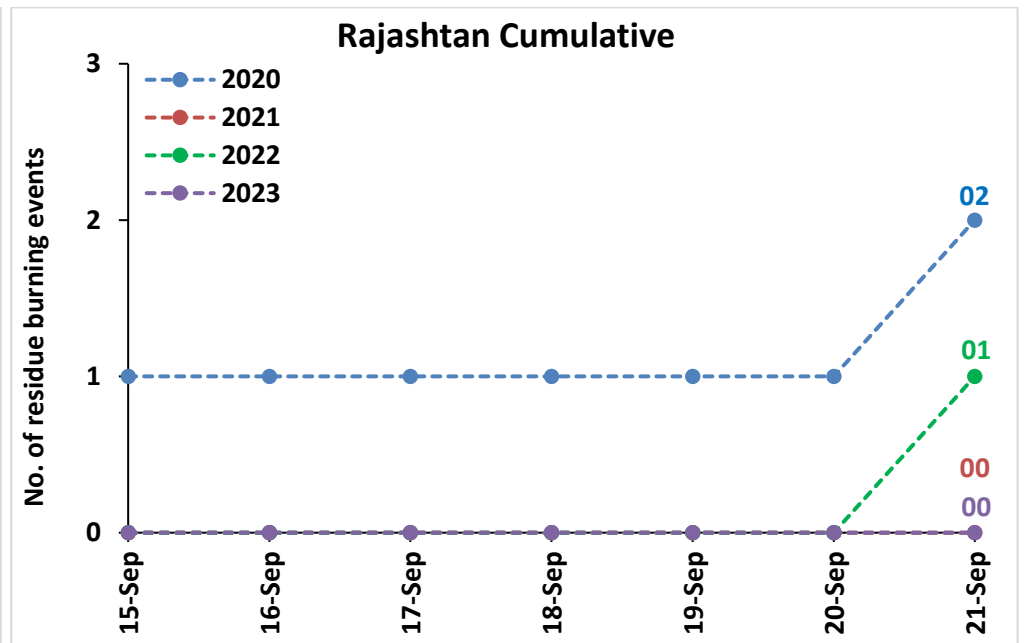
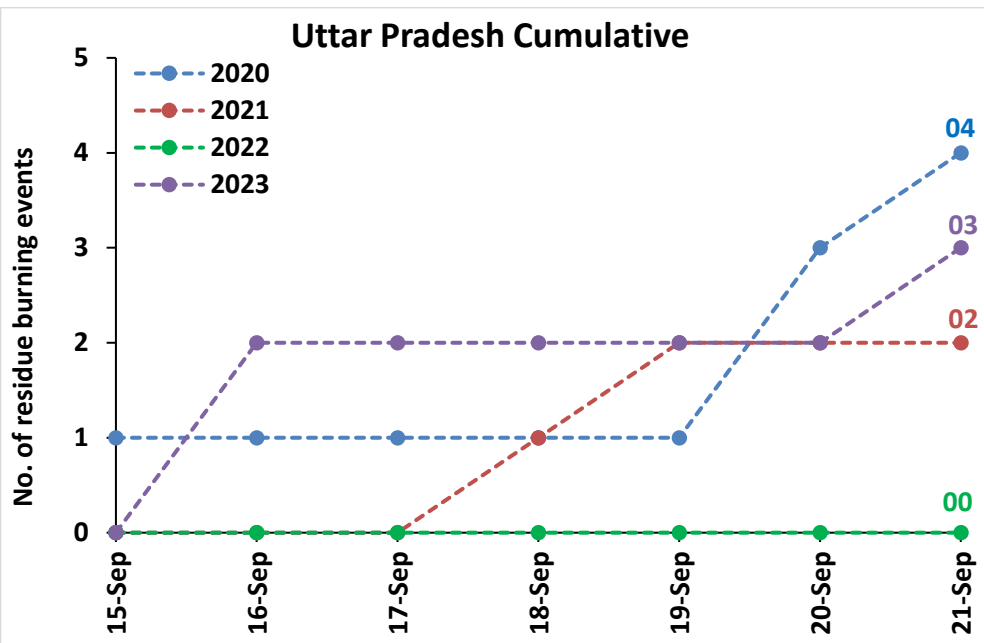
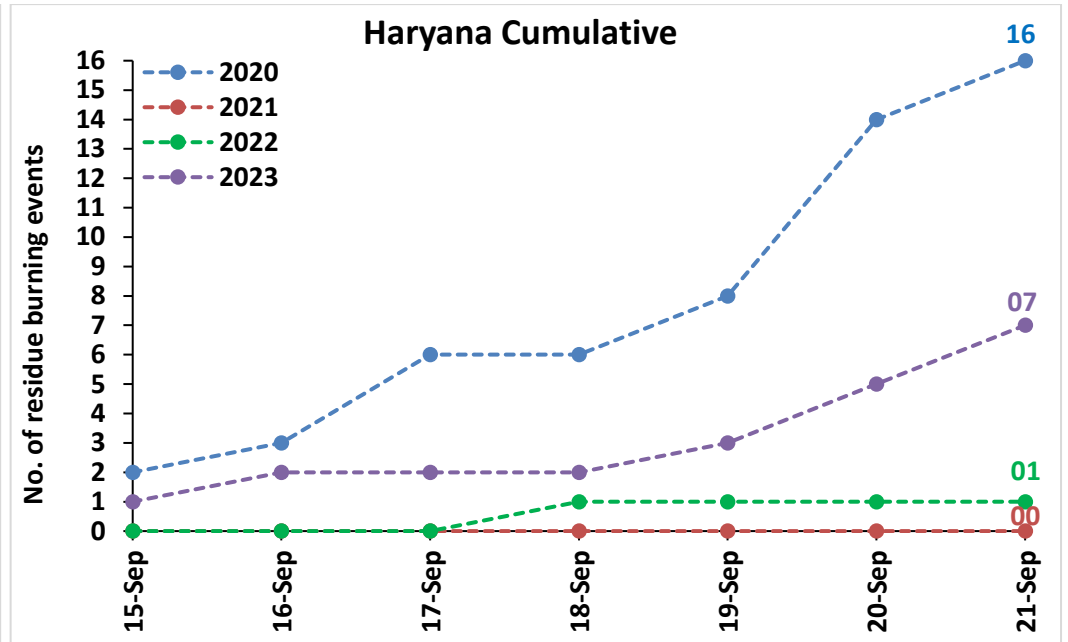
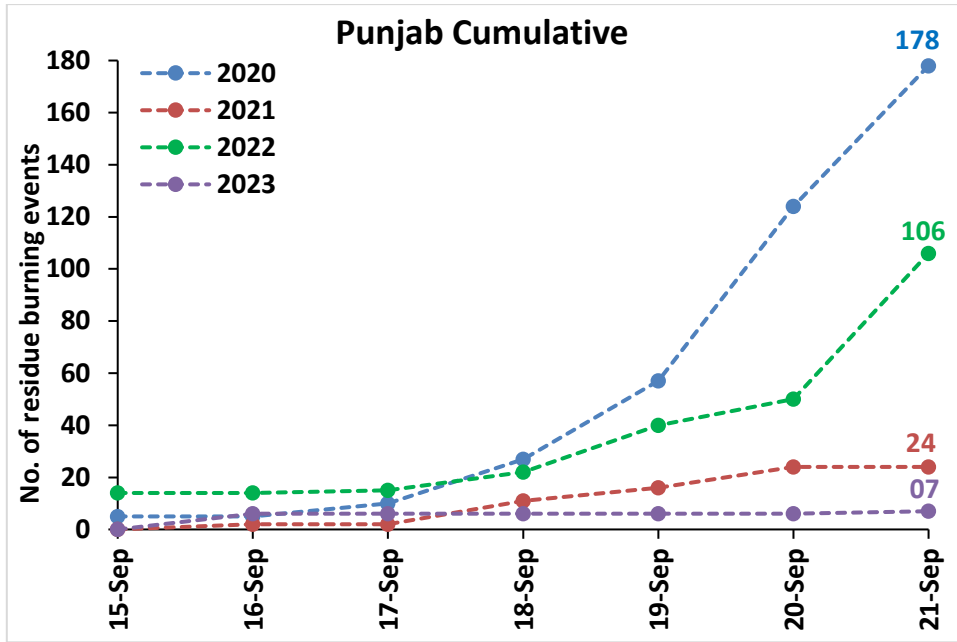
Madhya Pradesh



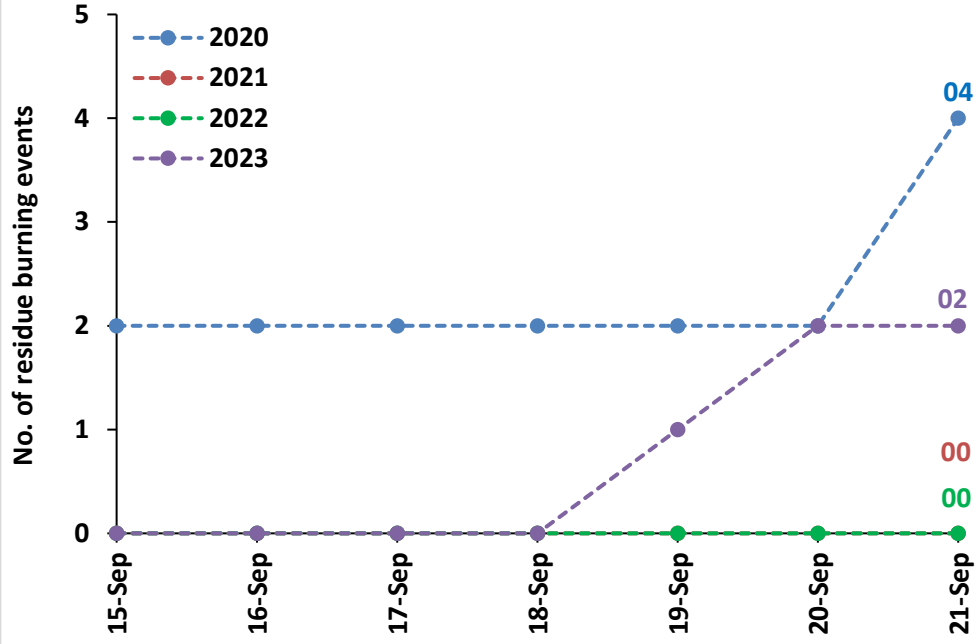
Delhi



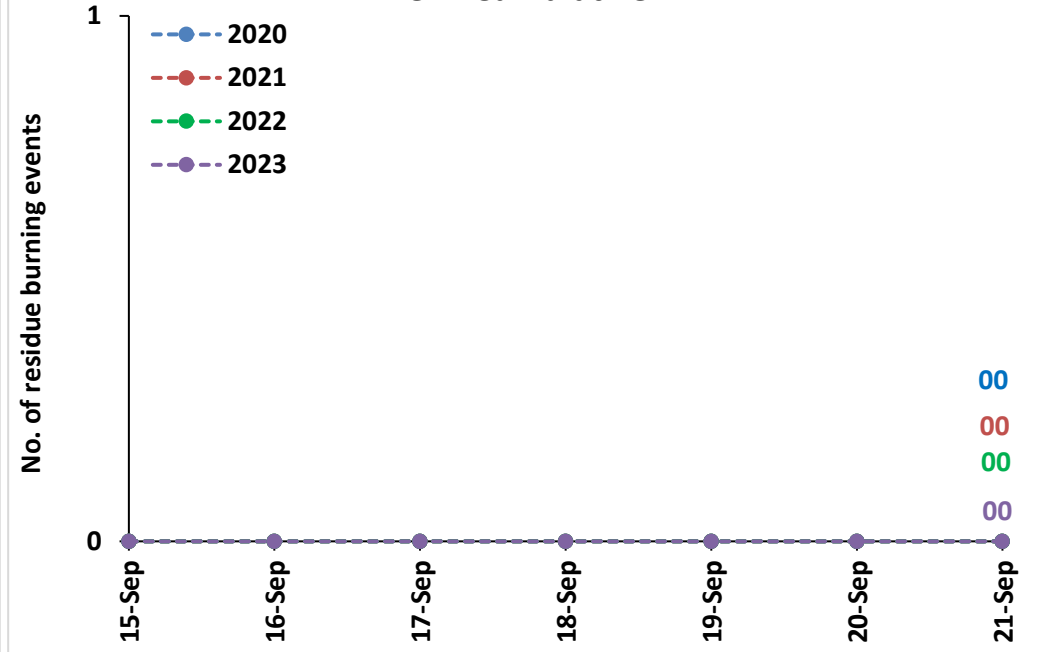
Comparison of residue burning events in current year (2023) with previous years (2020, 2021 and 2022) for the study States



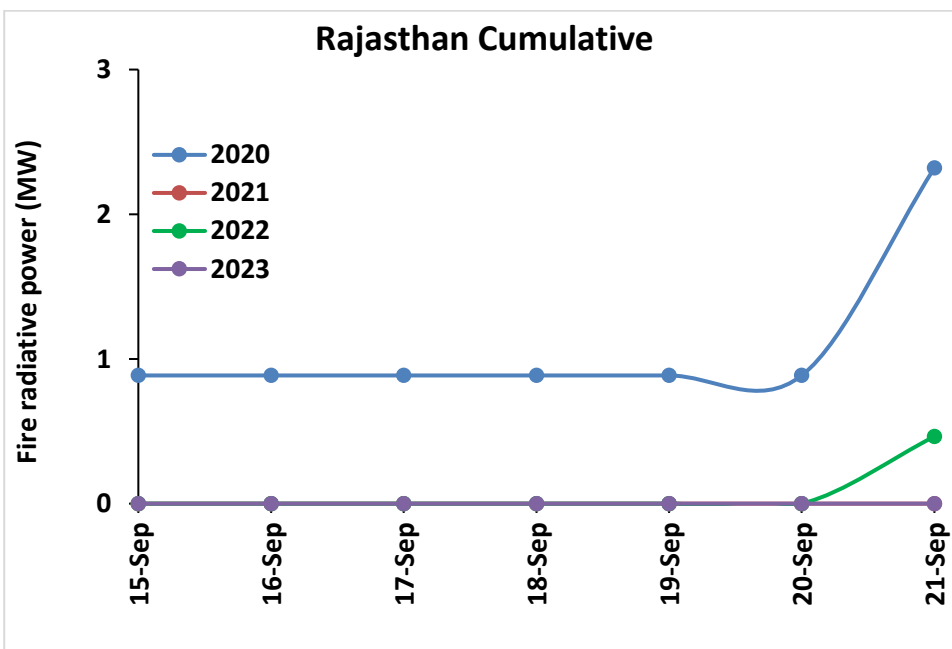
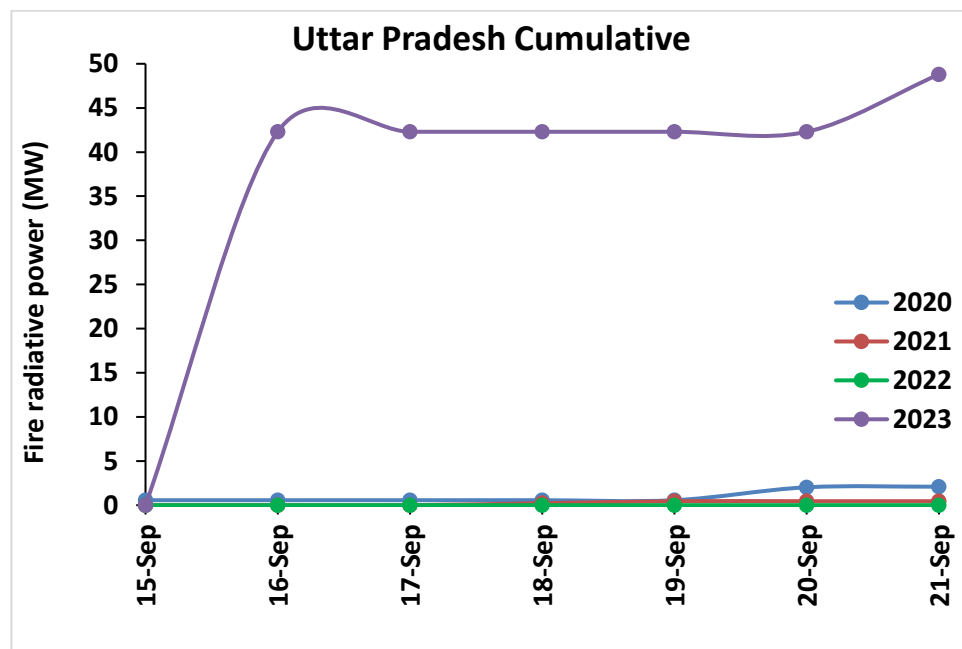
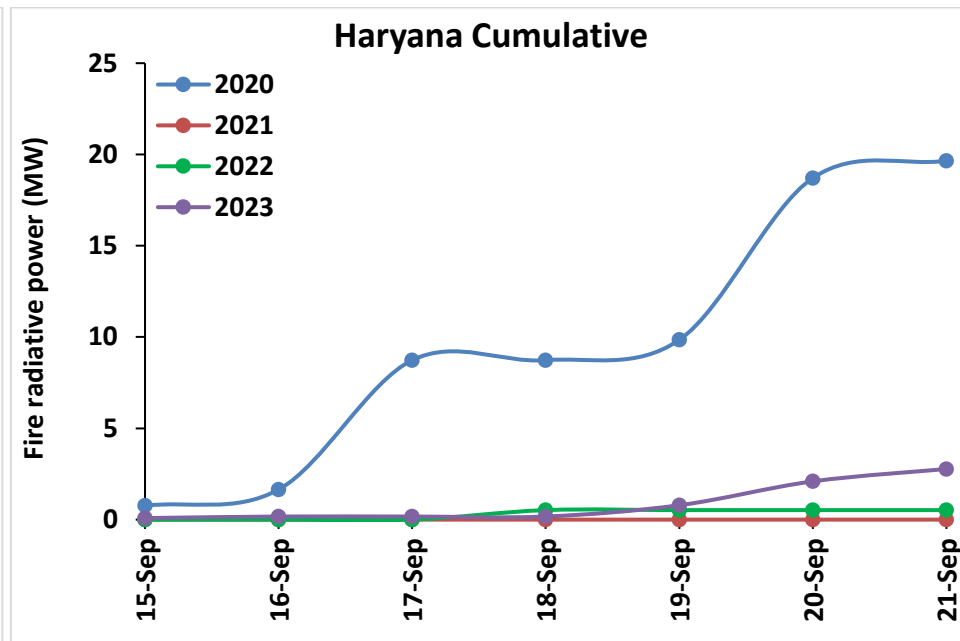
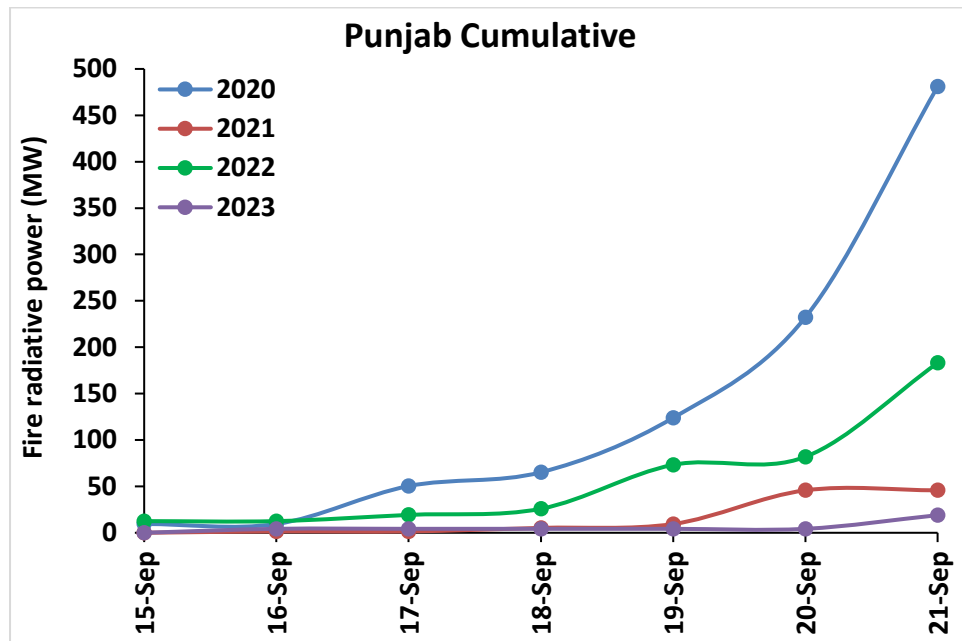
Madhya Pradesh Cumulative

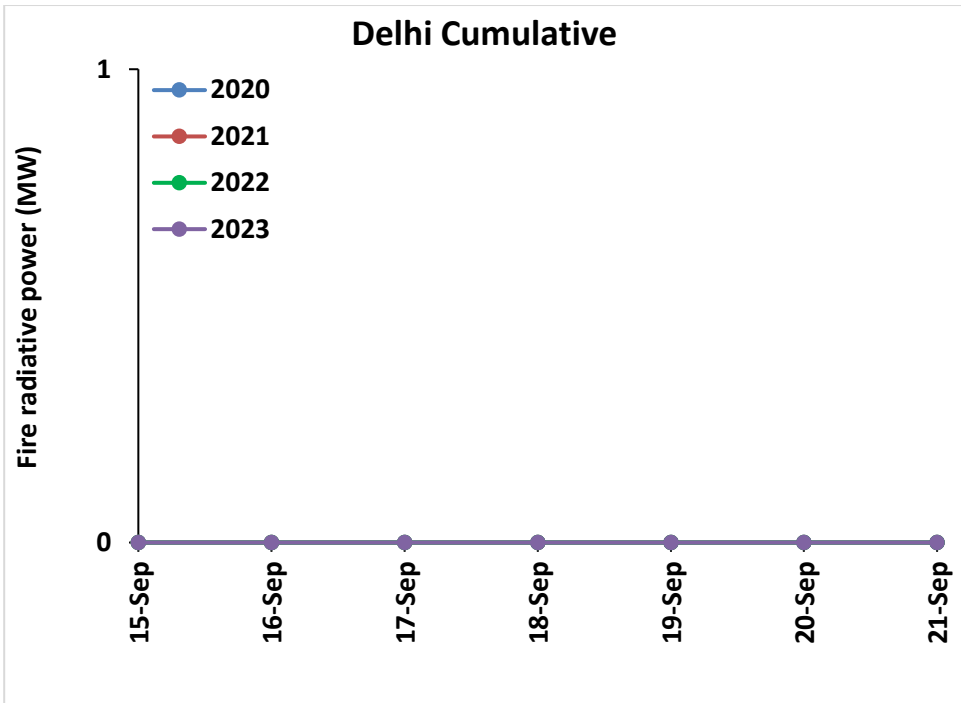
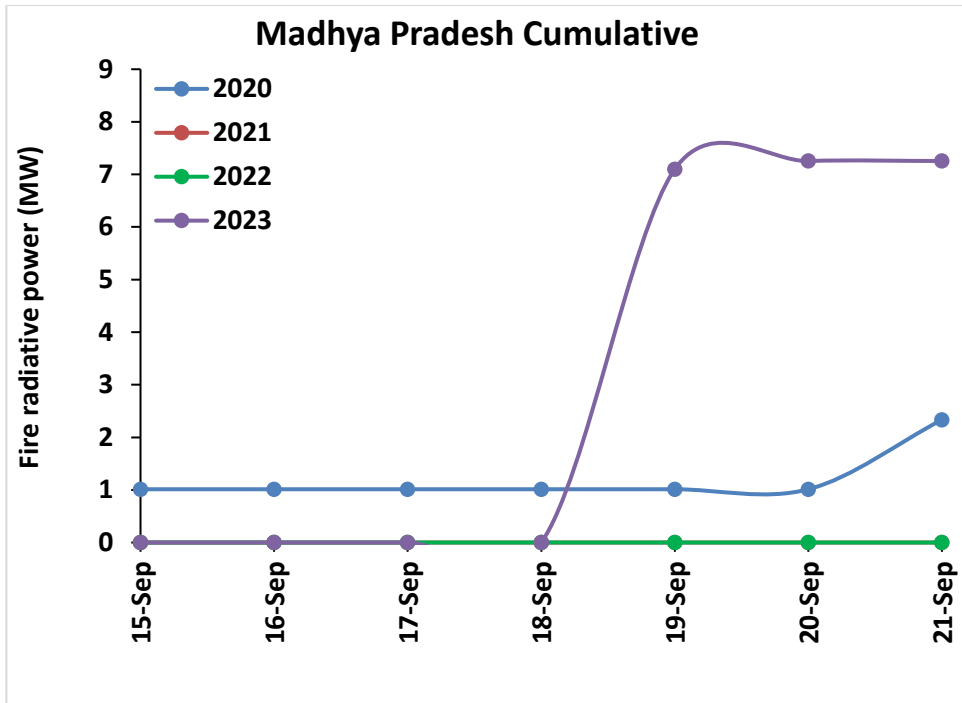


Delhi Cumulative



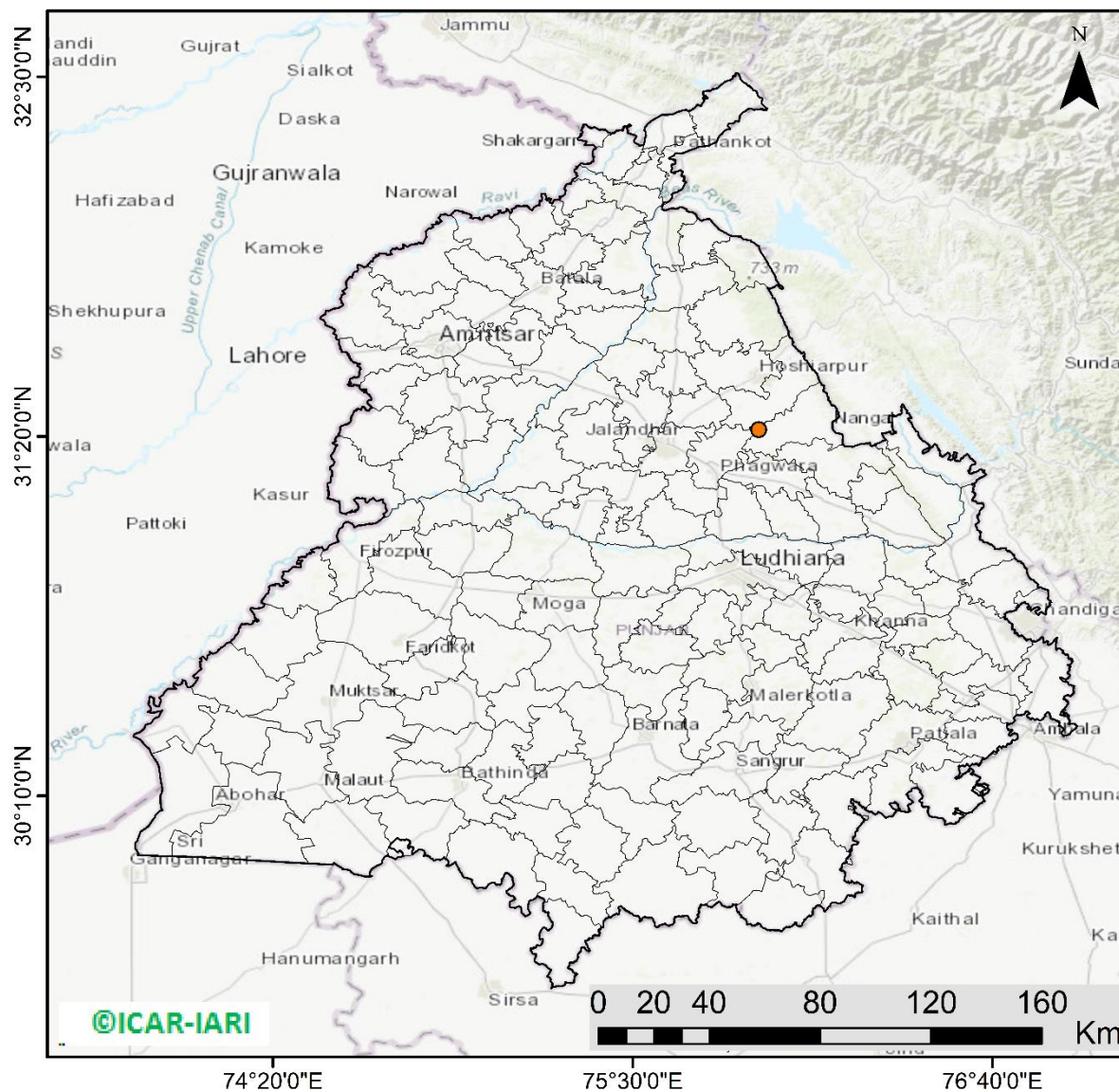
Comparison of residue burning fire power in current year (2023) with previous years (2020, 2021 and 2022) for the study States





Punjab

RICE RESIDUE BURNING IN PUNJAB



01 burning events detected in Punjab during (21st Sep 2023)

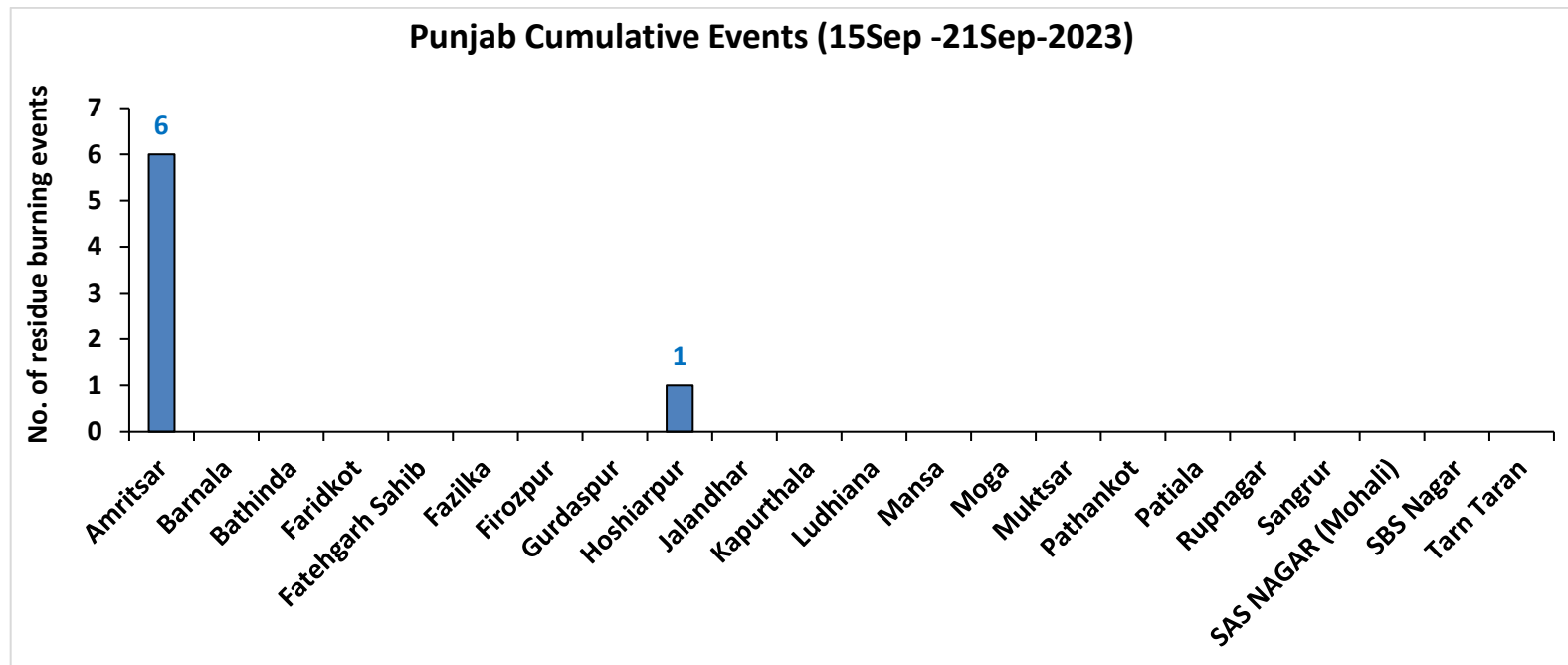
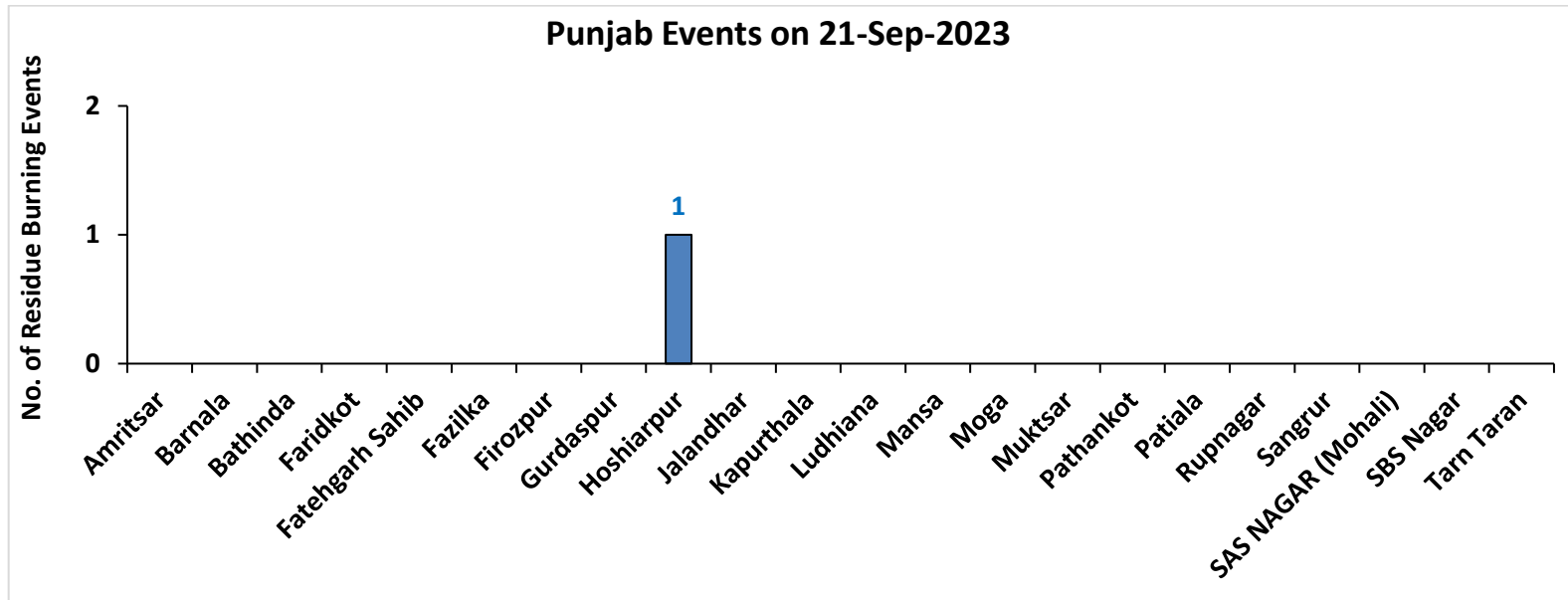
Fire Intensity (W/m²)

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



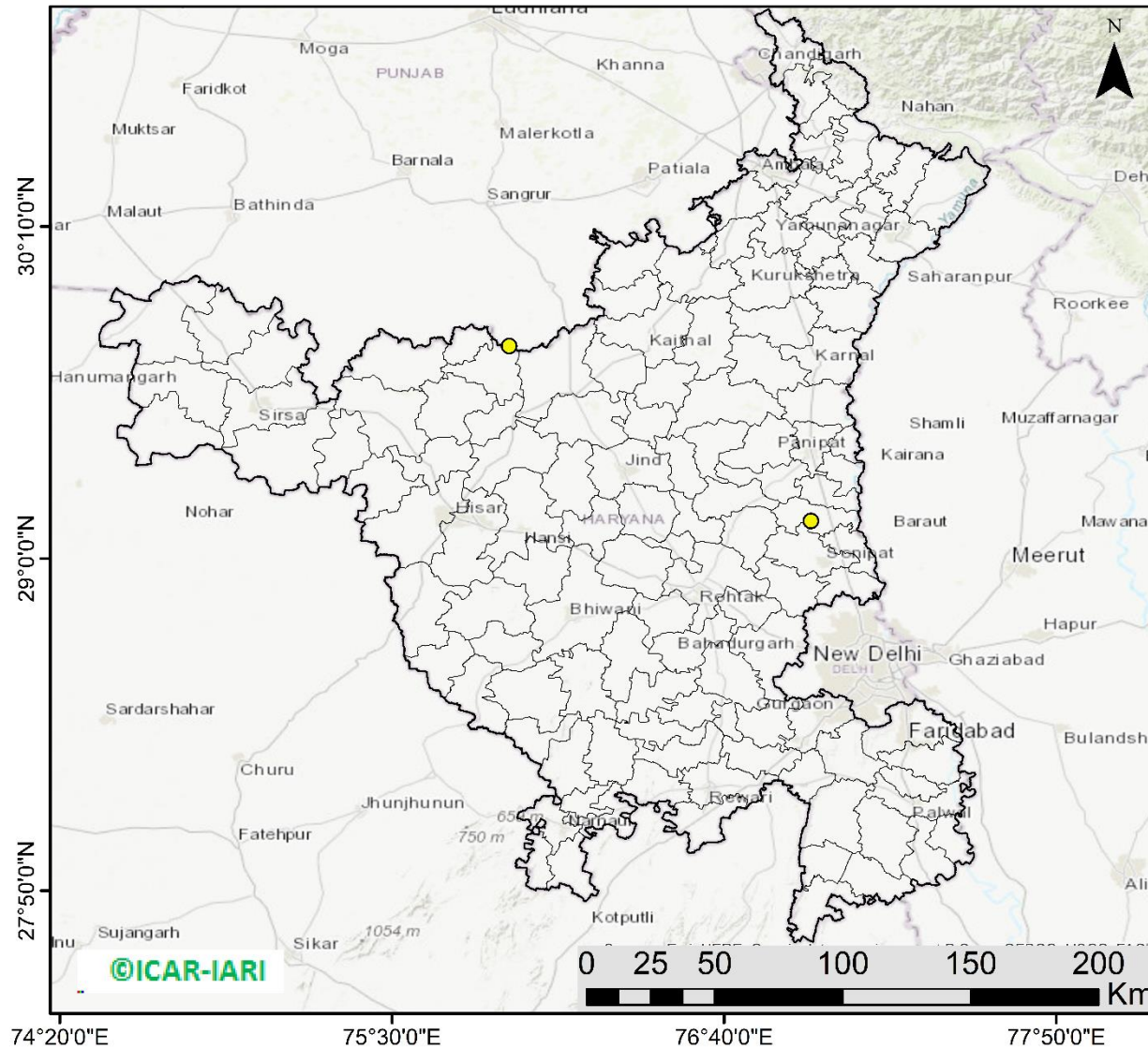
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Punjab (15Sep- 21Sep-2023)



Haryana

RICE RESIDUE BURNING IN HARYANA



02 burning events detected in Haryana on (21st Sep 2023)

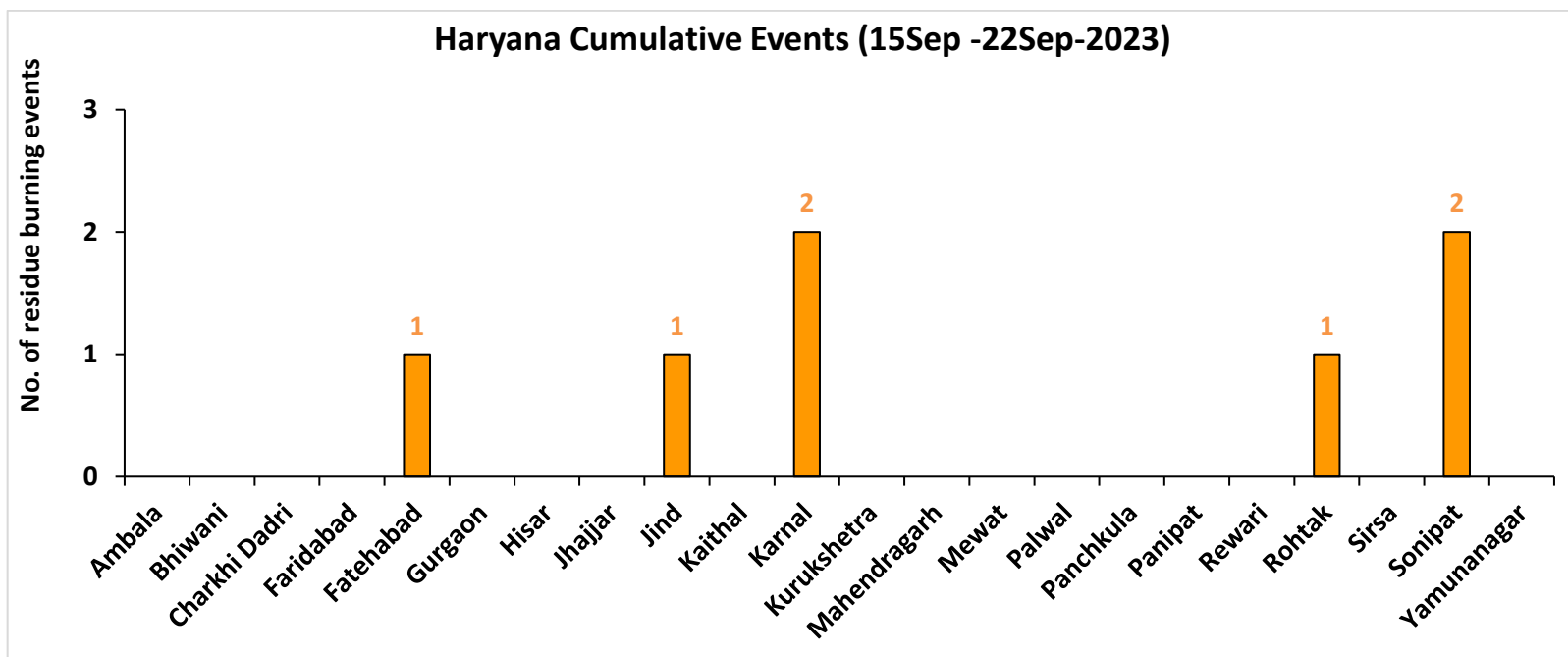
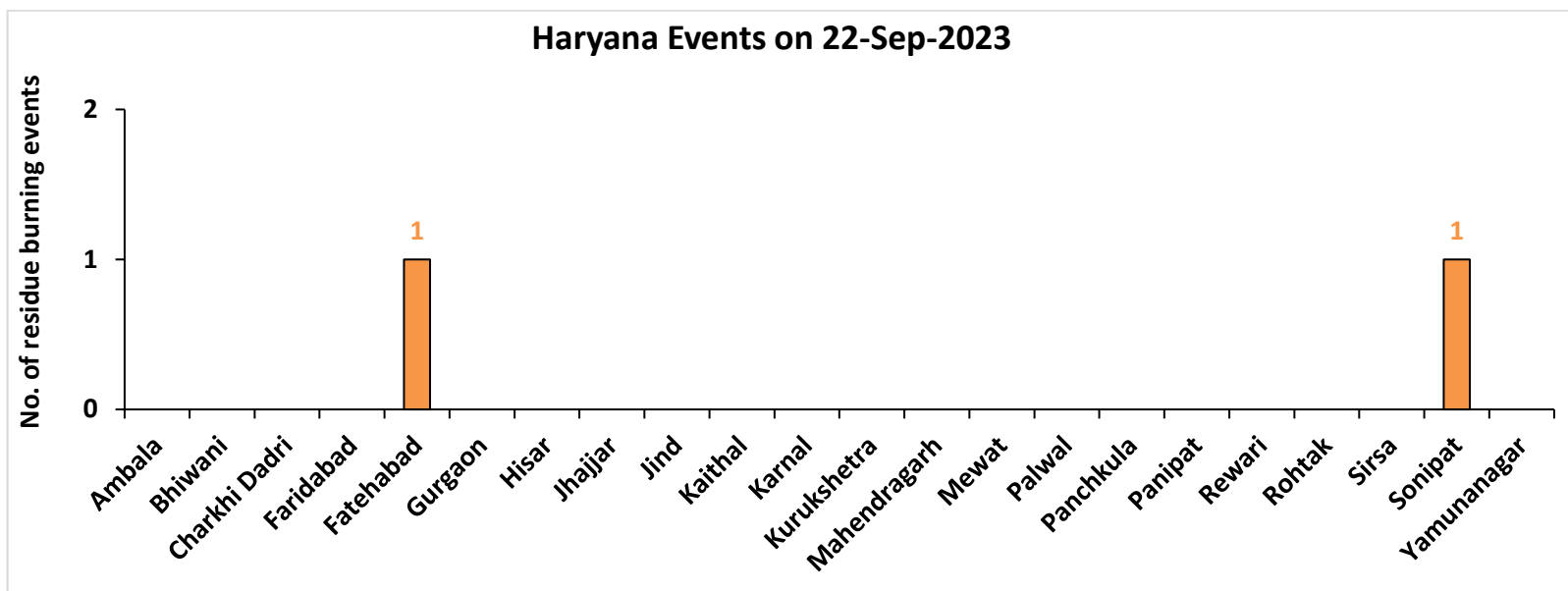
Fire Intensity (W/m²)

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



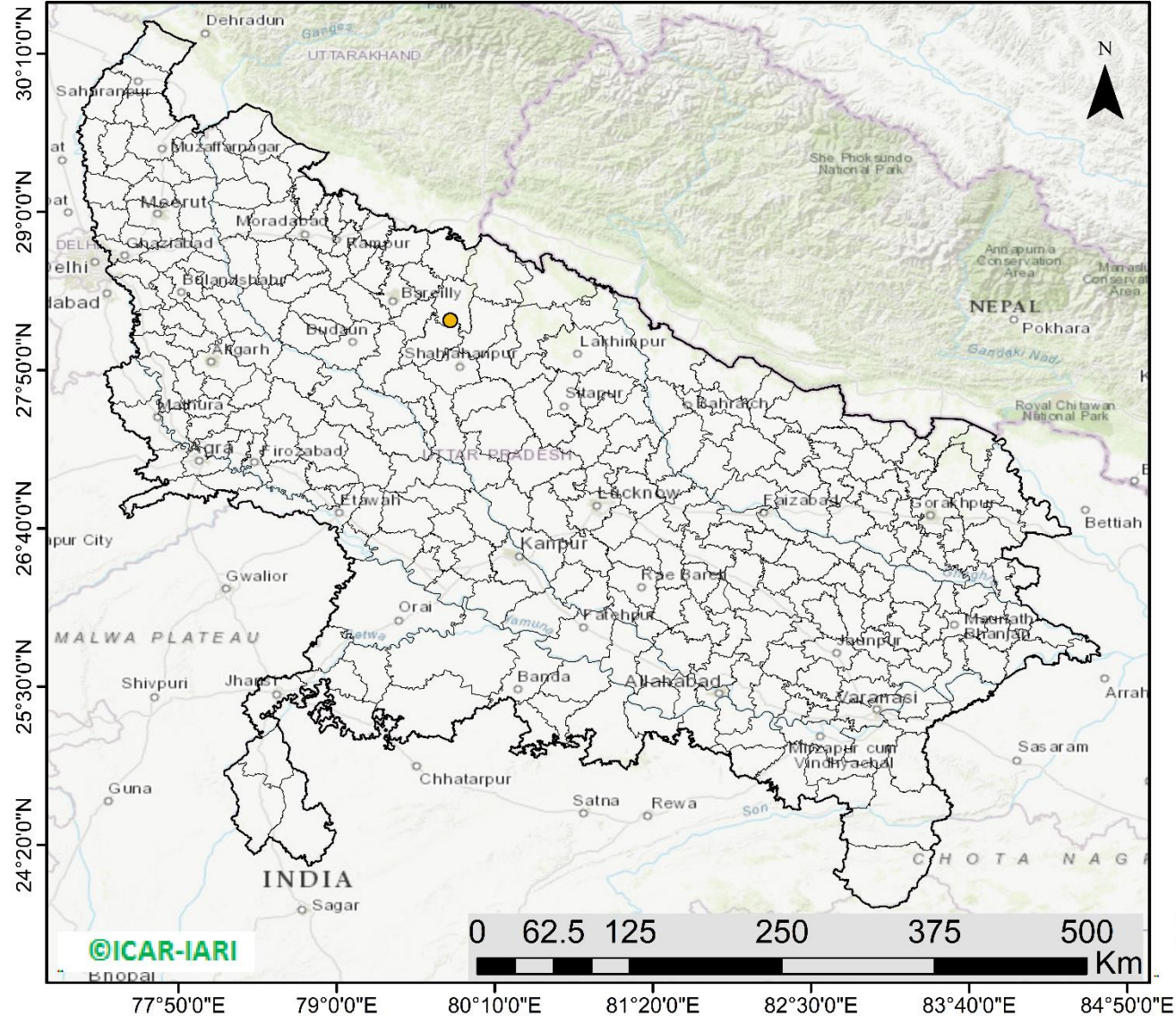
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Haryana (15Sep-21Sep-2023)



Uttar Pradesh

RICE RESIDUE BURNING IN UTTAR PRADESH



01 burning events detected in Uttar Pradesh on (21st Sep 2023)

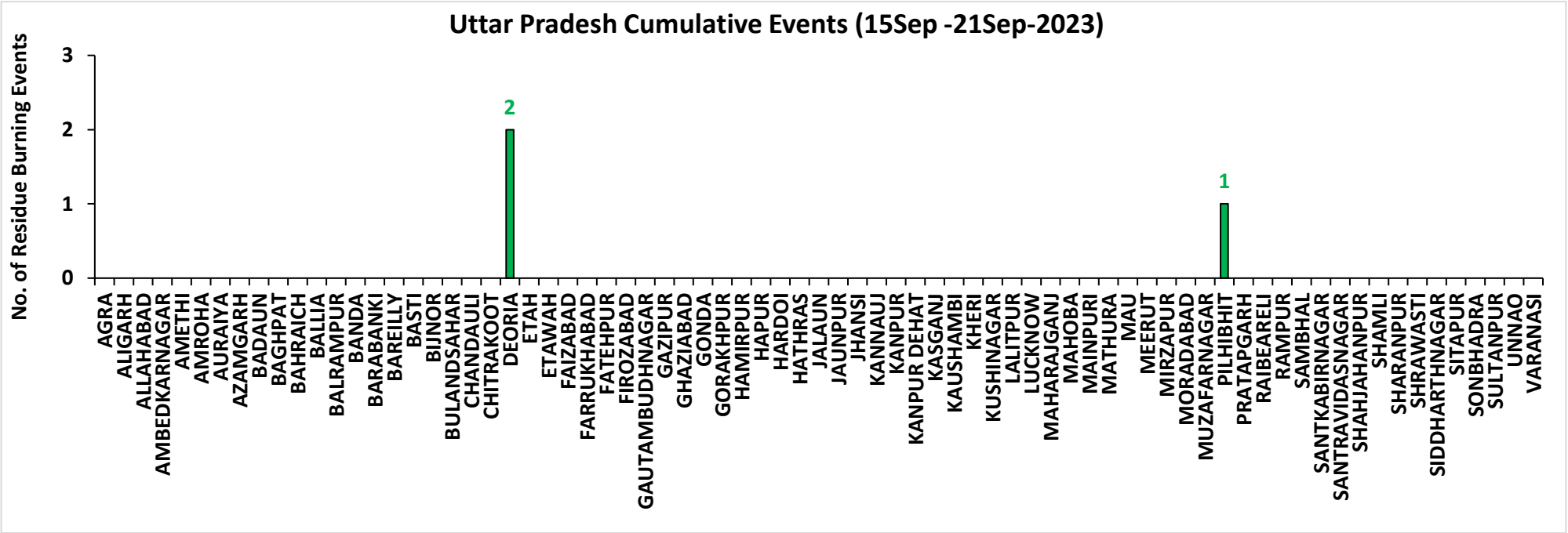
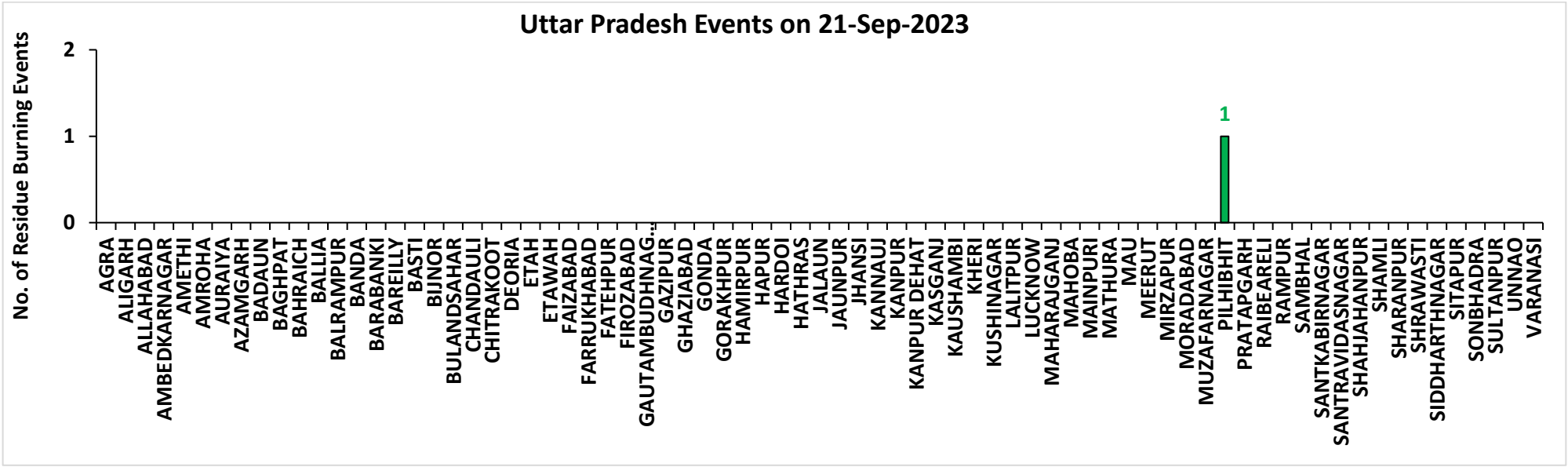
Fire Intensity (W/m2)

- 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-21Sep-2023)



District-wise cumulative number of residues burning events detected in 2020, 2021, 2022 and 2023
(Period: 15 September-21 September)

(a) Punjab

District	15 Sep-21 Sep			
	2020	2021	2022	2023
Amritsar	163	19	90	6
Barnala	0	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	0
Gurdaspur	1	0	1	0
Hoshiarpur	0	0	0	1
Jalandhar	0	0	0	0
Kapurthala	2	0	0	0
Ludhiana	2	0	0	0
Mansa	1	0	0	0
Moga	0	0	0	0
Muktsar	1	0	0	0
Pathankot	0	0	0	0
Patiala	0	3	1	0
Rupnagar	0	0	0	0
Sangrur	0	0	0	0
SAS NAGAR (Mohali)	1	0	1	0
SBS Nagar	0	0	1	0
Tarn Taran	7	1	12	0
Total	178	24	106	7

(b) Haryana

District	15 Sep-21 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	2
KURUKSHETRA	2	0	0	0
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	0
Total	17	0	1	7

(c) Uttar Pradesh

District	15 Sep-21 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	0	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	0
BADAUN	0	0	0	0	JALAUN	0	0	0	0	SHAMLI	1	0	0	0
BAGHPAT	0	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	0	0	0	0	KUSHINAGAR	0	0	0	0	Total	4	2	0	3
BULANSAHAR	0	0	0	0	LALITPUR	0	0	0	0					
CHANDAULI	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	0	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-21 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-21 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	0	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
NAGOUR	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	2	0	1	0

(f) Madhya Pradesh

District	15 Sep-21 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-21 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
Total	178	24	106	7	16	0	1	7	4	2	0	3

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
Total	0	0	0	0	2	0	1	0	4	0	0	2

Details of residue burning events in Punjab on 21-Sep-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	HOSHIARPUR	MAHILPUR	AQUA	31.35500	75.90900	13:31:58	D	14.70

Details of residue burning events in Haryana on 21-Sep-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	FATEHABAD	TOHANA	S-NPP	29.74600	75.91209	12:46:18	D	2.60
2	SONIPAT	GANAUR	S-NPP	29.13178	76.97227	12:46:18	D	2.20

Details of residue burning events in Uttar Pradesh on 21-Sep-2023

S. No.	District	Tehsil / Block	Satellite	Latitude	Longitude	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	PILHIBHIT	BISALPUR	AQUA	28.19900	79.83900	13:31:58	D	6.50

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 (ISRO)**

Study Team

ICAR - IARI	Dr V.K. Sehgal	Pr. Scientist & Nodal Officer	iaricreams@gmail.com
	Dr Rajkumar Dhakar	Scientist	rajdhakar.iari@gmail.com
	Mr Mohd Jahangir	Lab Assistant (KRISHI)	mjahangir198@gmail.com
ICAR - ATARI	Dr Parvender Sheoran	Director ATARI (Zone-I) Ludhiana	zcu1ldh@gmail.com
	Dr. J.P. Mishra	Director ATARI (Zone-II) Jodhpur	jp.mishra67@gov.in
	Dr S.K. Dubey	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)
