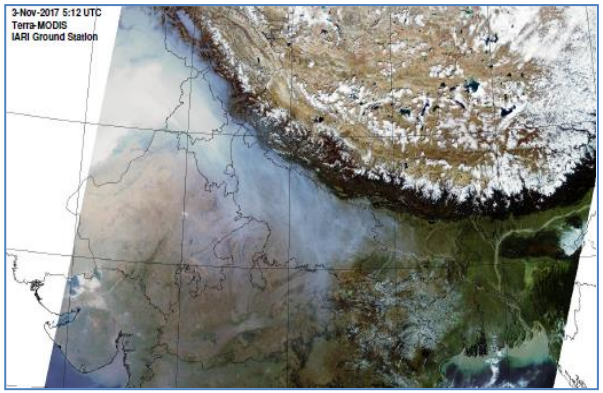
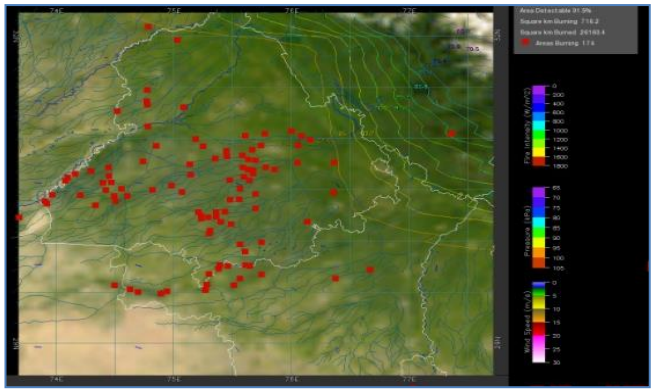
MONITORING PADDY RESIDUE BURNING IN INDIA USING SATELLITE REMOTE SENSING DURING 2021





Bulletin No. 14

Events Date: 28-Sep-2021

Issued on: 28-Sep-2021

Prepared by:

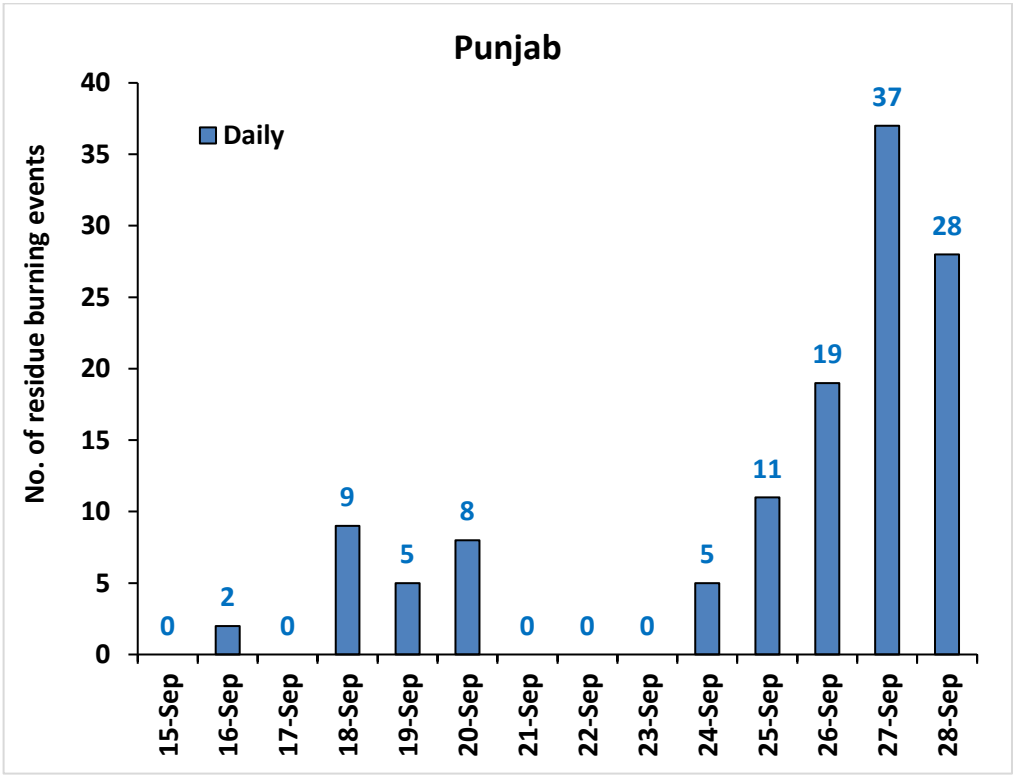
Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory, Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012

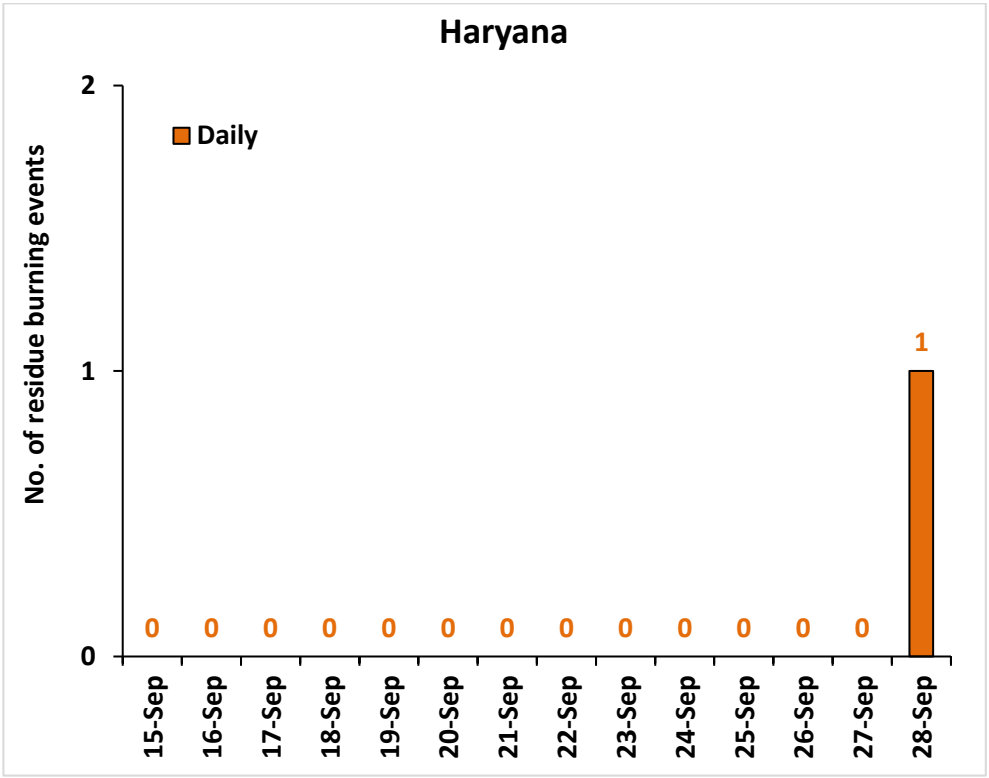
http://creams.iari.res.in

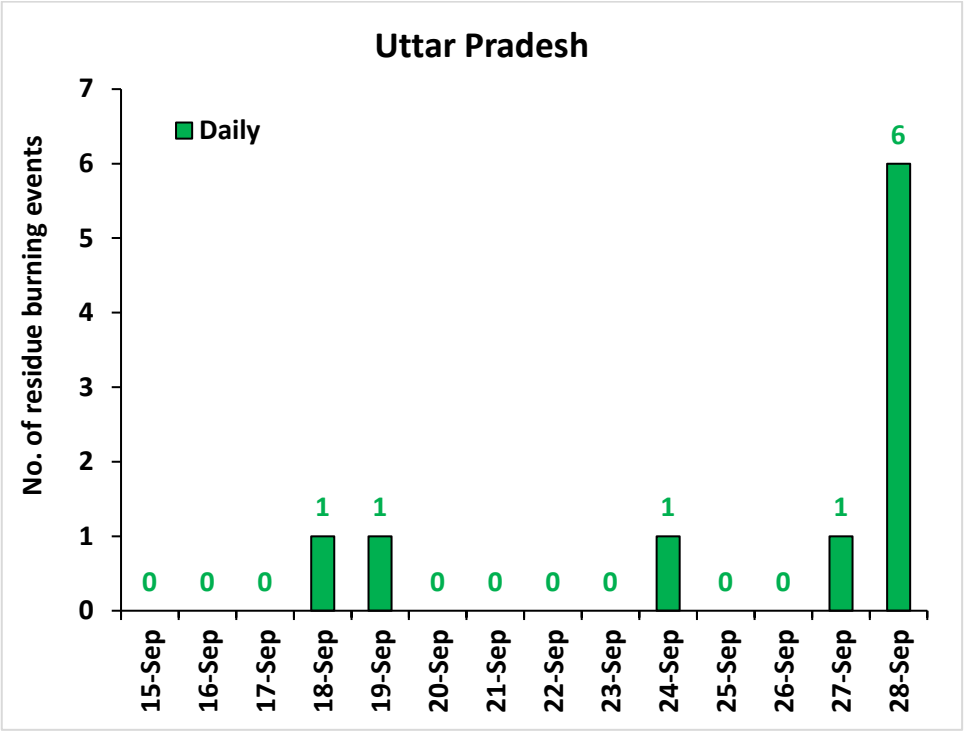
Highlights for 28-September-2021

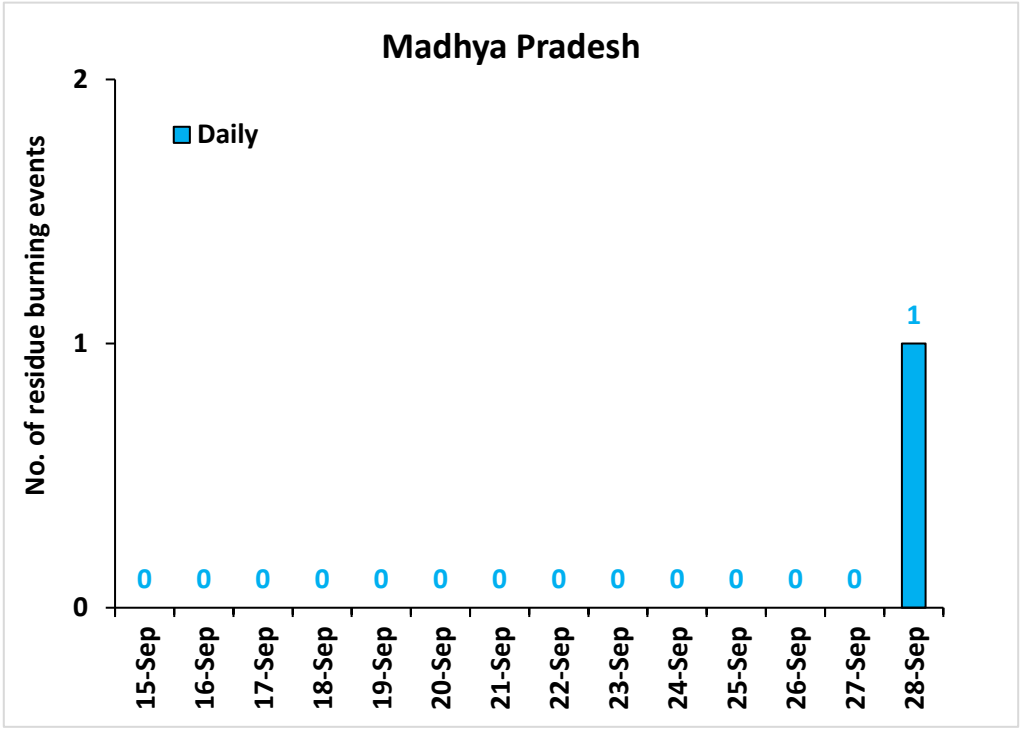
- The active fire events due to rice residue burning were monitored using satellite remote sensing, following the new "Standard Protocol for Estimation of Crop Residue Burning Fire Events using Satellite Data".
- Satellites detected **36** residue burning events in the six study States on 28-Sep-2021.
- The state wise events detected on 27-Sep-2021 were **28** in Punjab, **1** in Haryana, **6** in UP, **0** in Delhi, **0** in Rajasthan and **1** in MP.
- Detection of burning events by satellites was hampered due to cloud cover over Madhya Pradesh.

Temporal distribution of rice residue burning events for the study States in 2021

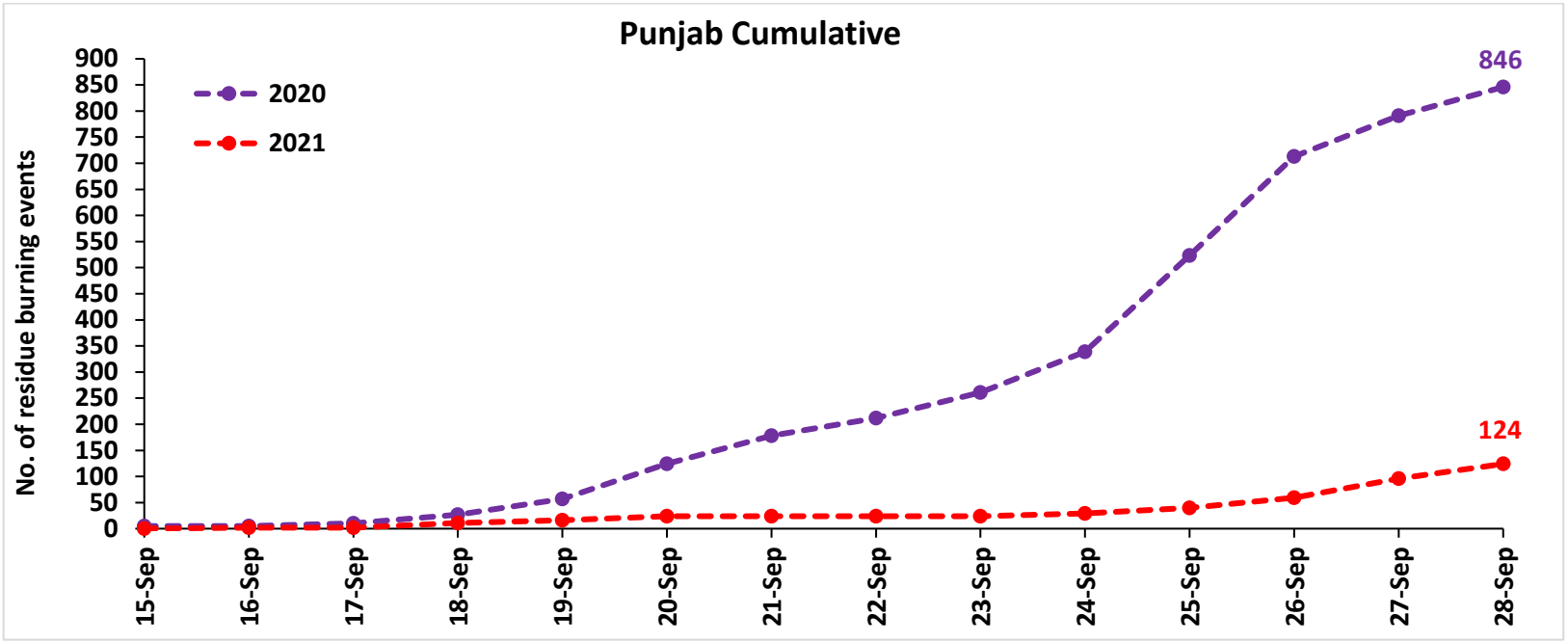


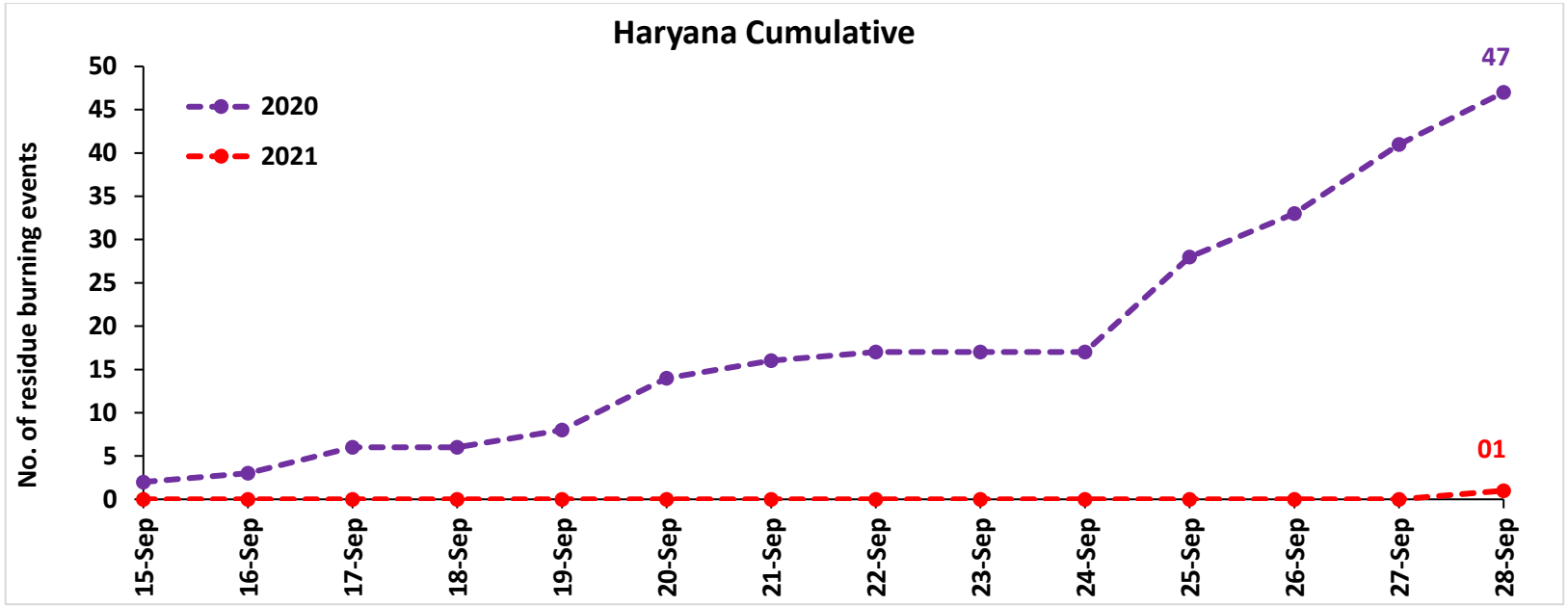


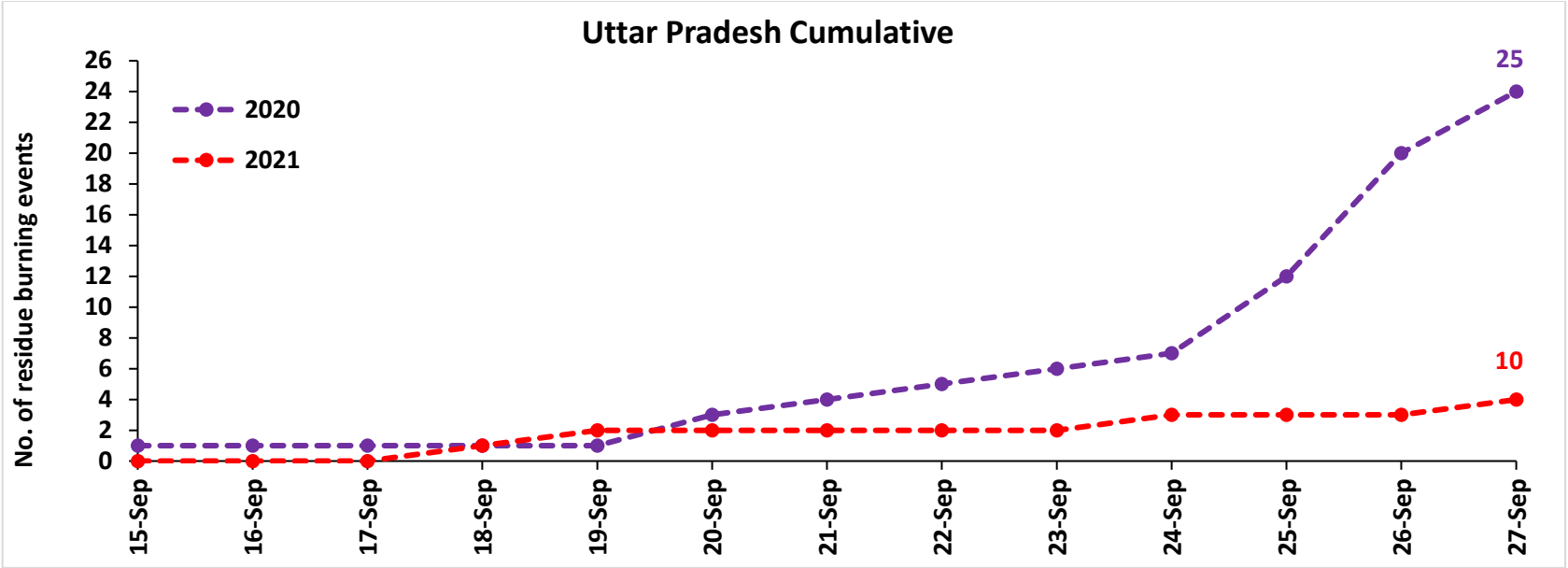

Uttar Pradesh
No. of residue burning events
Daily
0 1 2 3 4 5 6 7
0 0 0 1 1 0 0 0 0 1 0 0 1 6
15-Sep 16-Sep 17-Sep 18-Sep 19-Sep 20-Sep 21-Sep 22-Sep 23-Sep 24-Sep 25-Sep 26-Sep 27-Sep 28-Sep

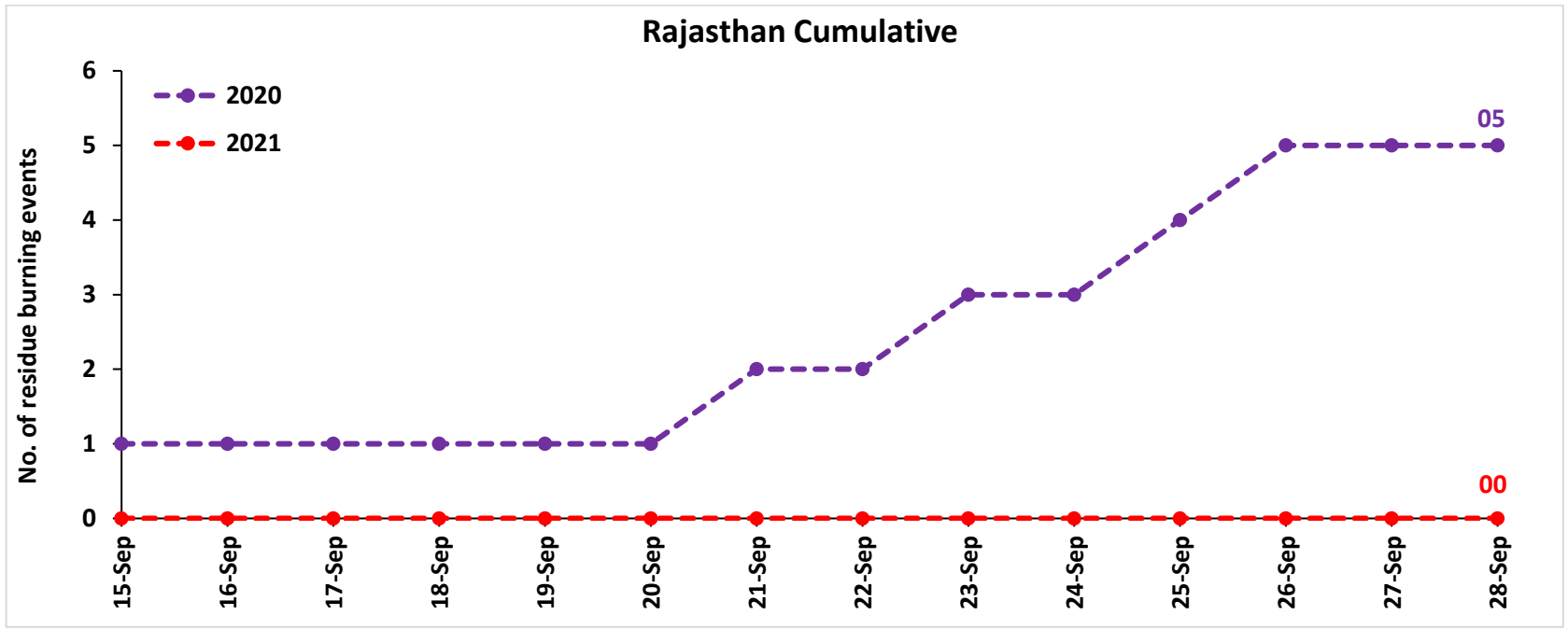

Madhya Pradesh
No. of residue burning events
Daily
0 1 2
0 0 0 0 0 0 0 0 0 0 0 0 0 1
15-Sep 16-Sep 17-Sep 18-Sep 19-Sep 20-Sep 21-Sep 22-Sep 23-Sep 24-Sep 25-Sep 26-Sep 27-Sep 28-Sep

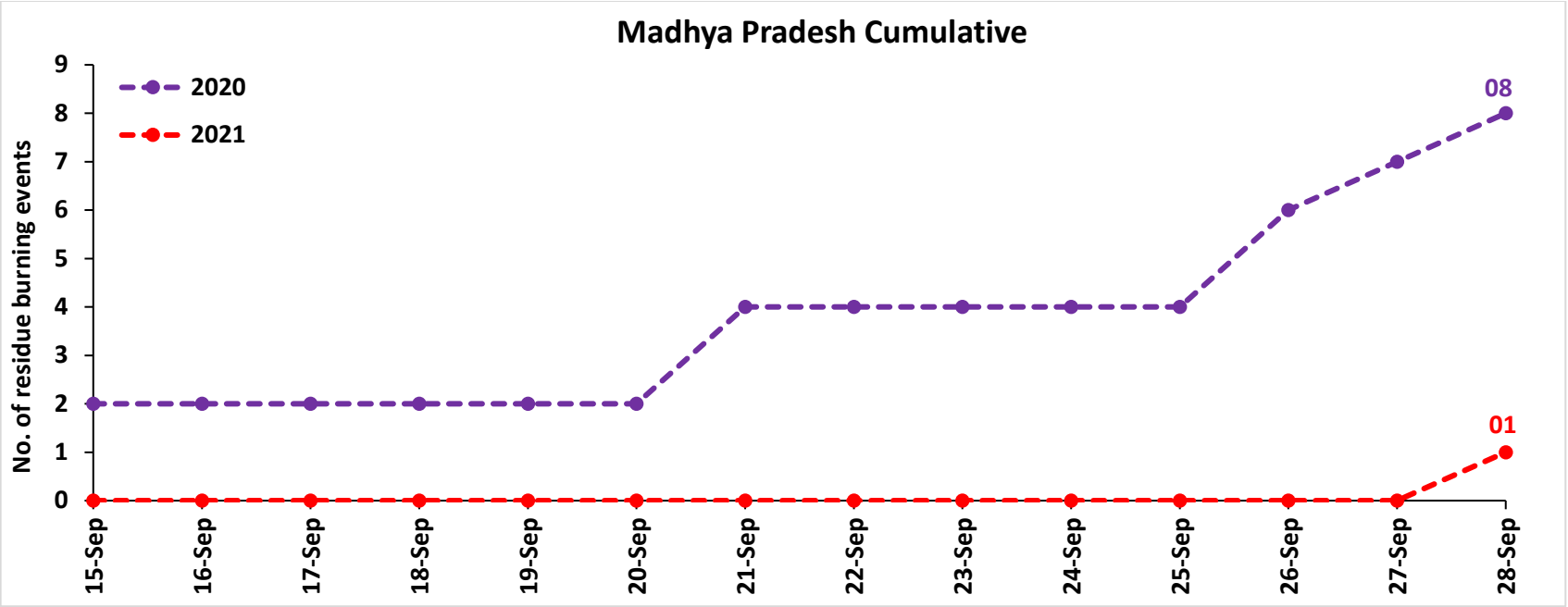
Comparison of residue burning events in current year (2021) with previous year (2020) for the study States





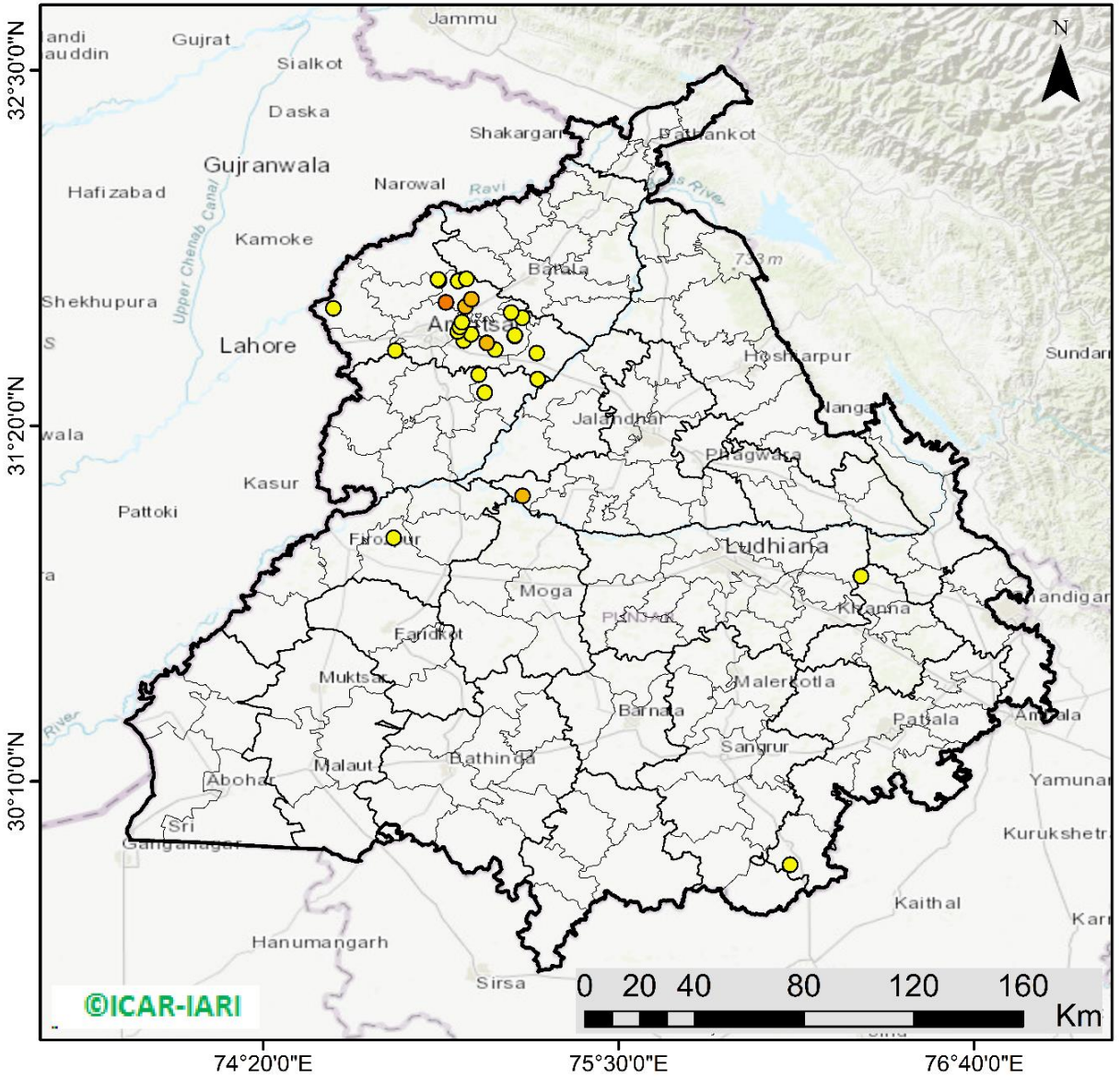

Uttar Pradesh Cumulative
No. of residue burning events
2020
2021
25
10
0
2
4
6
8
10
12
14
16
18
20
22
24
26
15-Sep
16-Sep
17-Sep
18-Sep
19-Sep
20-Sep
21-Sep
22-Sep
23-Sep
24-Sep
25-Sep
26-Sep
27-Sep


Rajasthan Cumulative
No. of residue burning events
2020
2021
05
00
0
1
2
3
4
5
6
15-Sep
16-Sep
17-Sep
18-Sep
19-Sep
20-Sep
21-Sep
22-Sep
23-Sep
24-Sep
25-Sep
26-Sep
27-Sep
28-Sep


Madhya Pradesh Cumulative
No. of residue burning events
2020
2021
08
01
0
1
2
3
4
5
6
7
8
9
15-Sep
16-Sep
17-Sep
18-Sep
19-Sep
20-Sep
21-Sep
22-Sep
23-Sep
24-Sep
25-Sep
26-Sep
27-Sep
28-Sep

Punjab

RICE RESIDUE BURNING IN PUNJAB



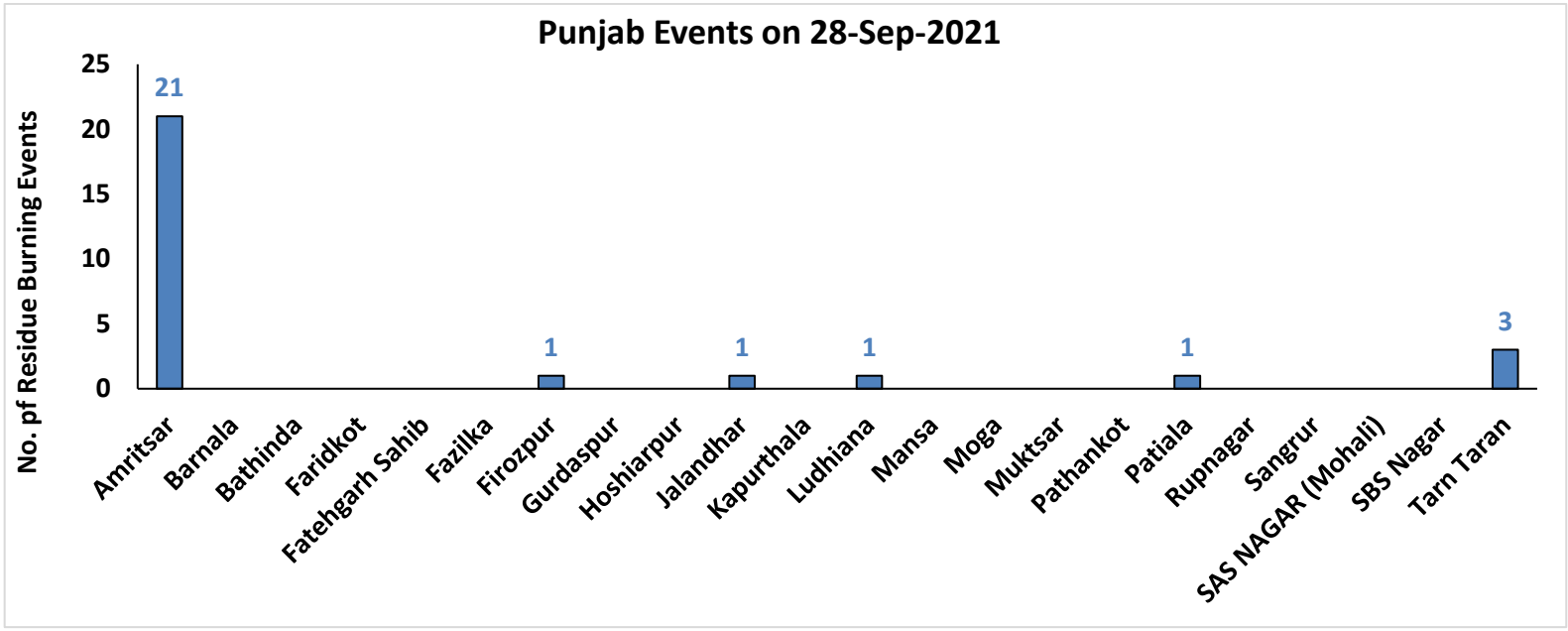
28 burning events detected in Punjab on **28th September 2021**

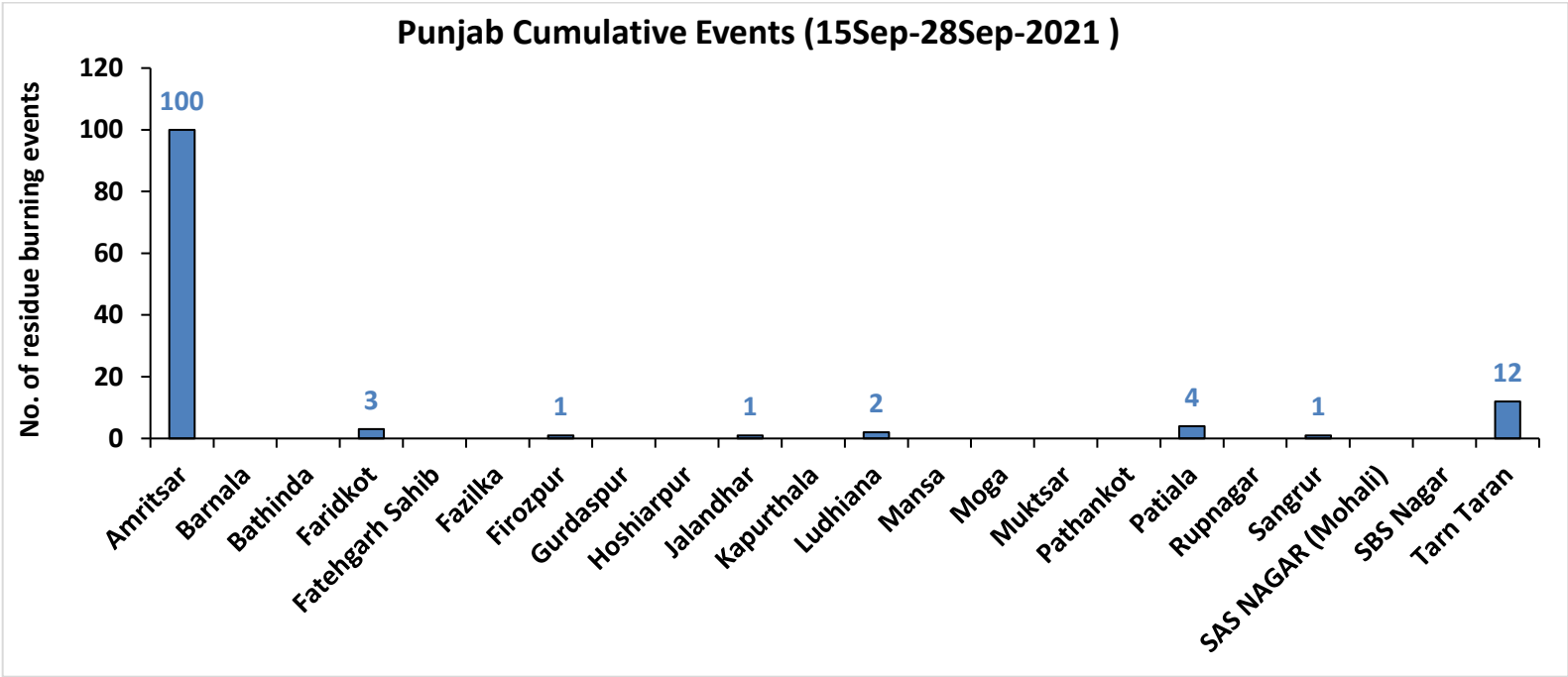
Fire Intensity (W/m2)

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

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

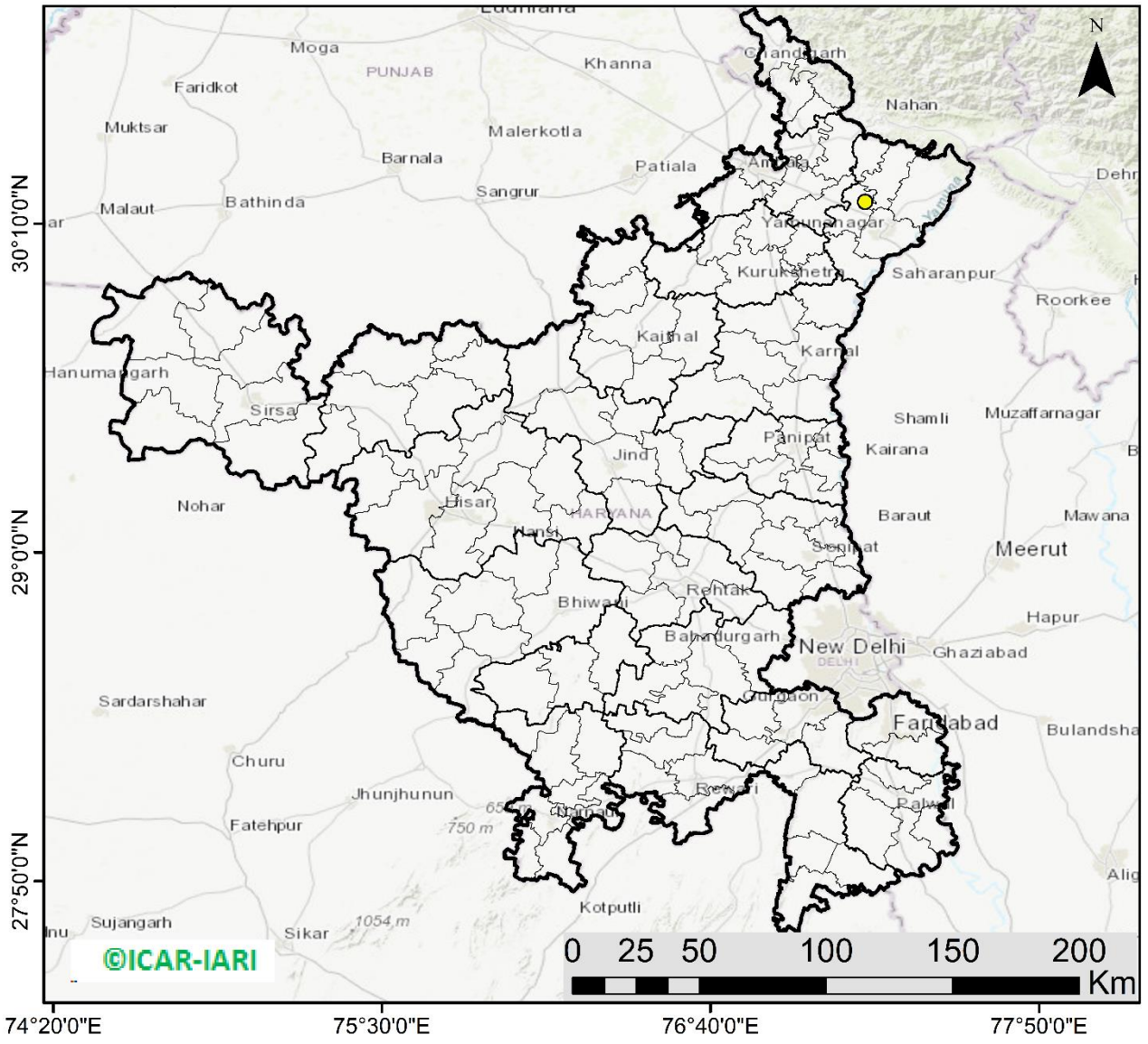
District-wise cumulative number of residues burning events in Punjab (15-28 Sep-2021)





Haryana

RICE RESIDUE BURNING IN HARYANA



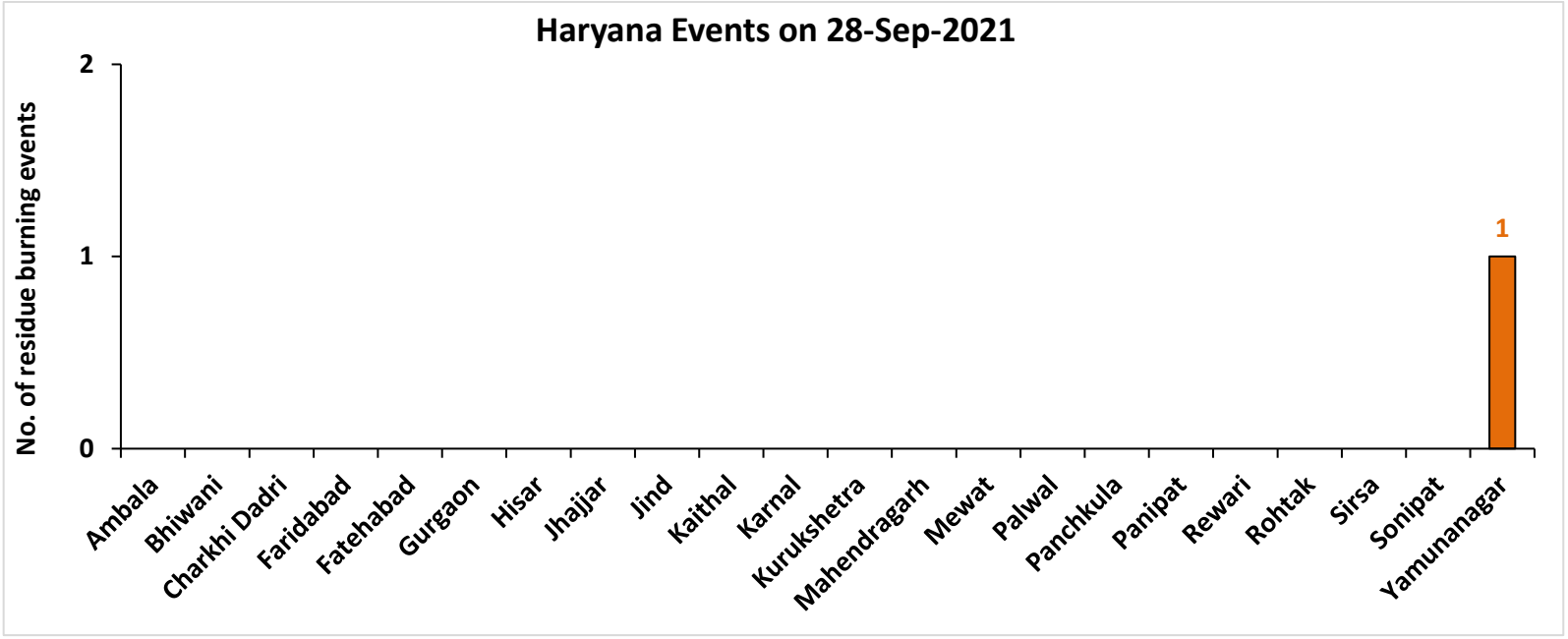
01 burning events detected in Haryana on **28th September 2021**

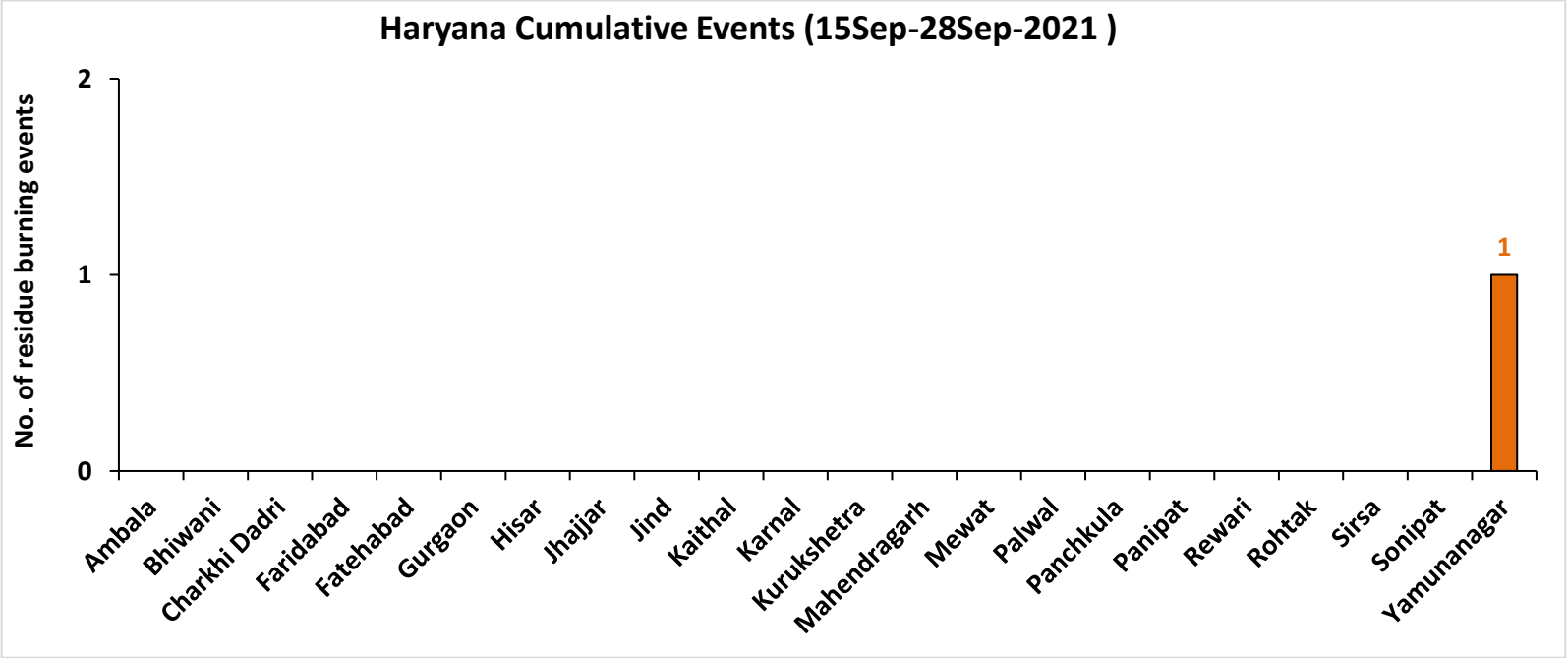
Fire Intensity (W/m2)

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

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

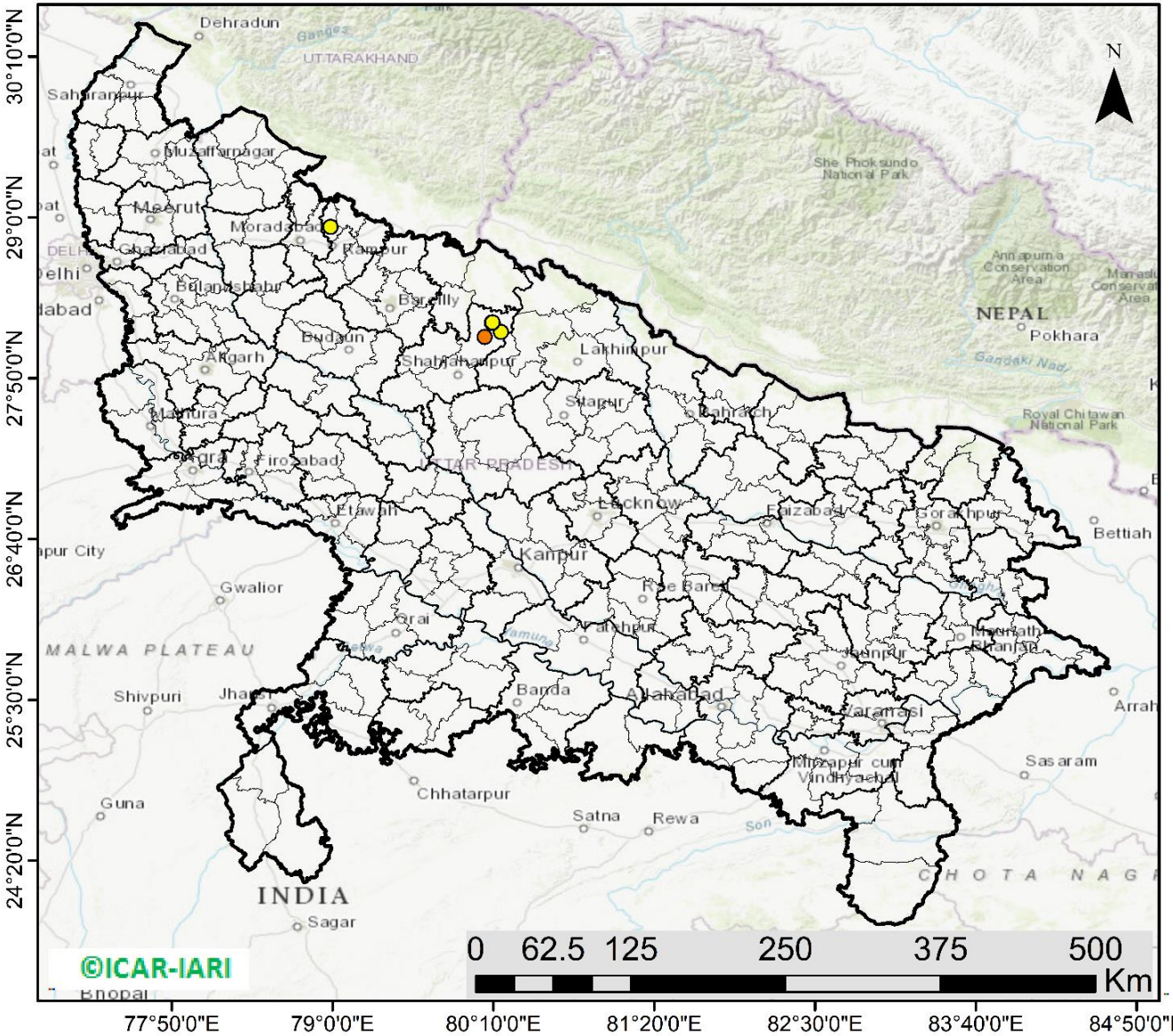
District-wise cumulative number of residues burning events in Haryana (15-28 Sep-2021)





Uttar Pradesh

RICE RESIDUE BURNING IN UTTAR PRADESH



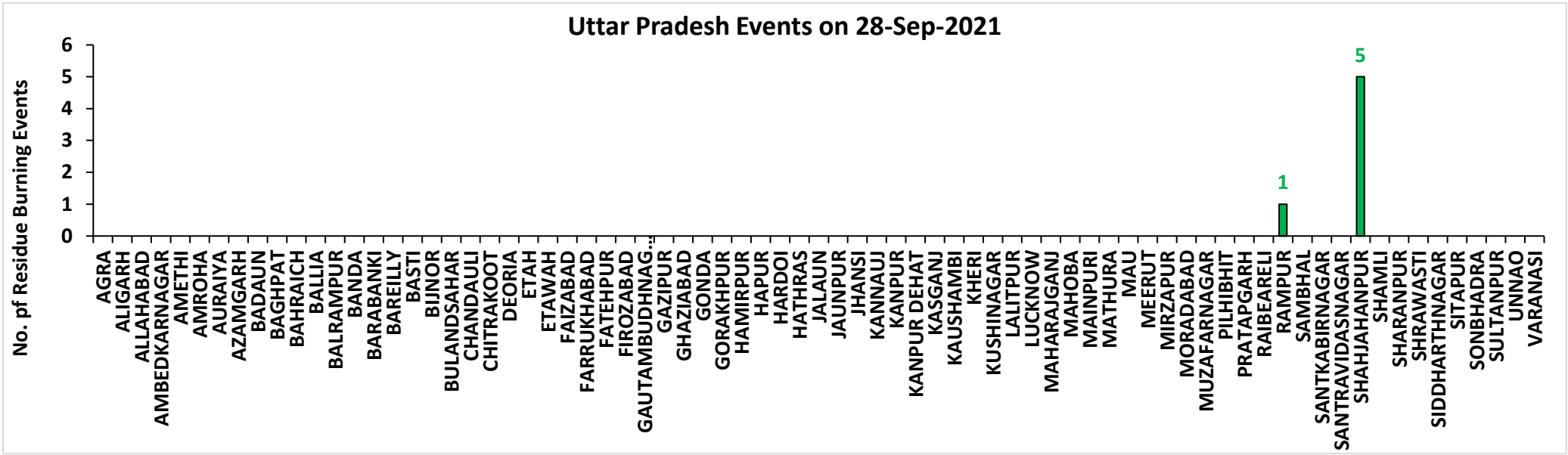
06 burning events detected in Uttar Pradesh on **28th September 2021**

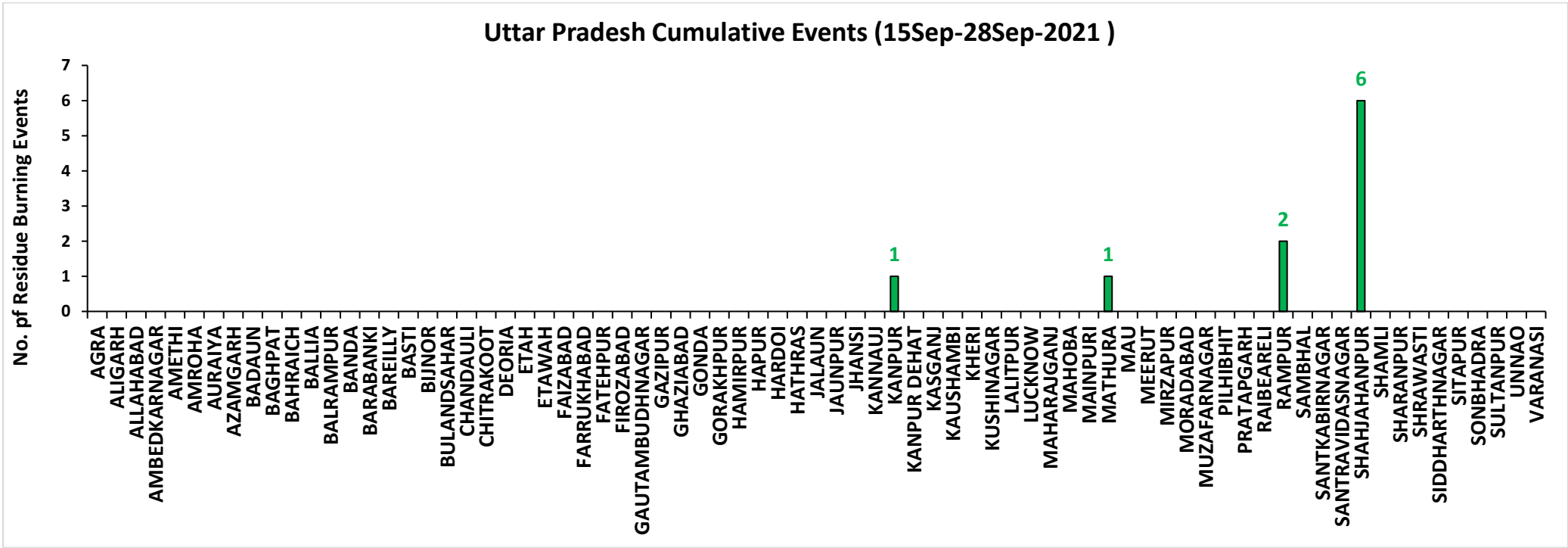
Fire Intensity (W/m2)

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

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

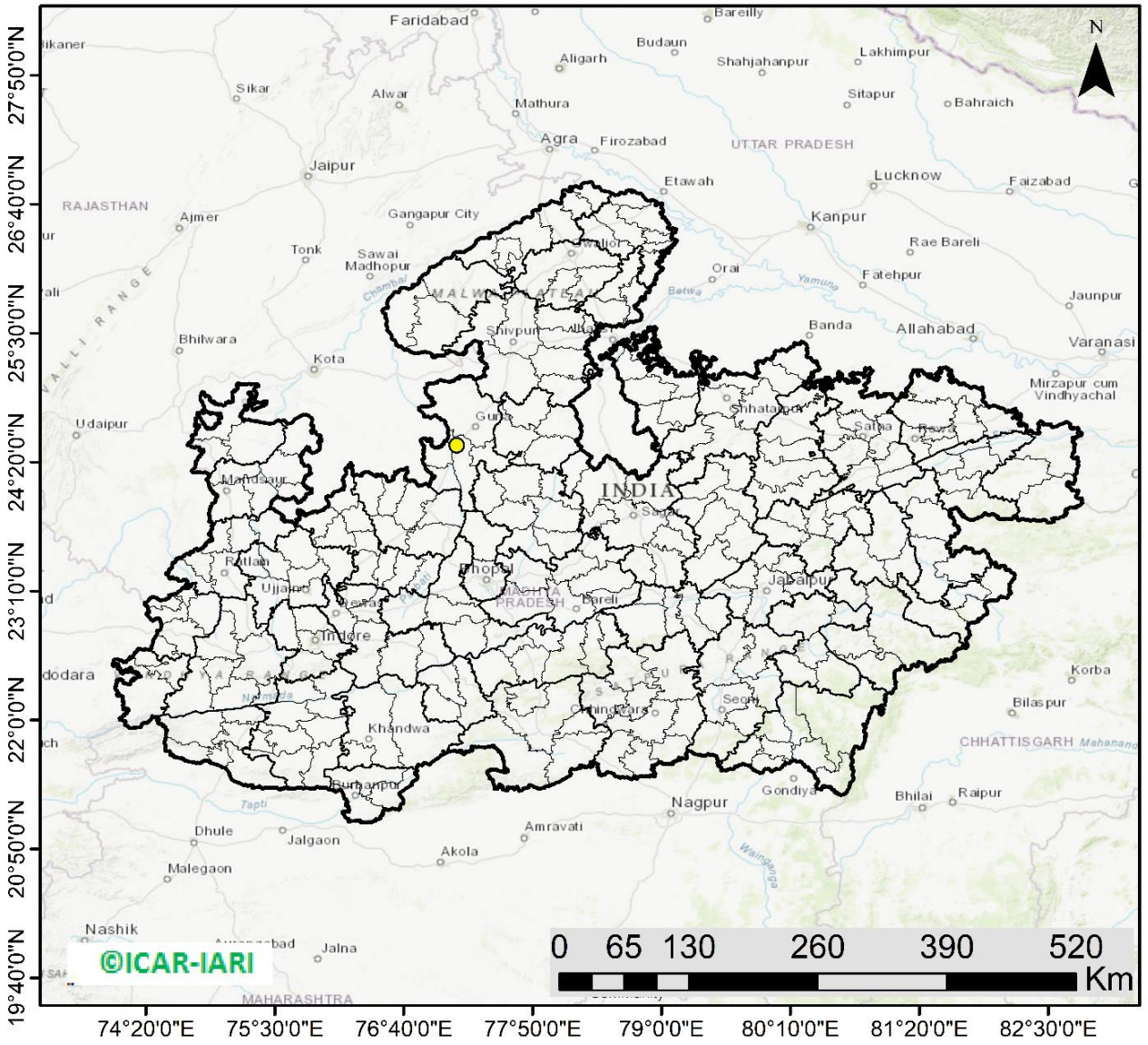
District-wise cumulative number of residues burning events in Uttar Pradesh (15-28 Sep-2021)





Madhya Pradesh

RICE RESIDUE BURNING IN MADHYA PRADESH



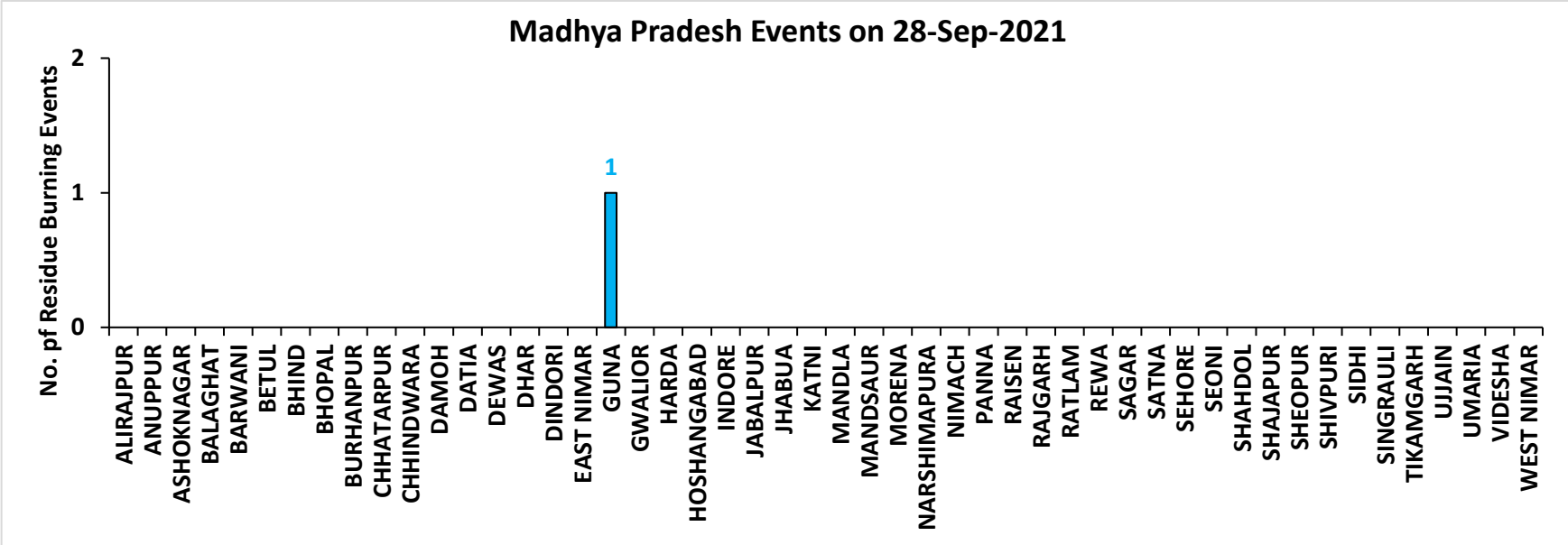
01 burning events detected in MP on **28th September 2020**

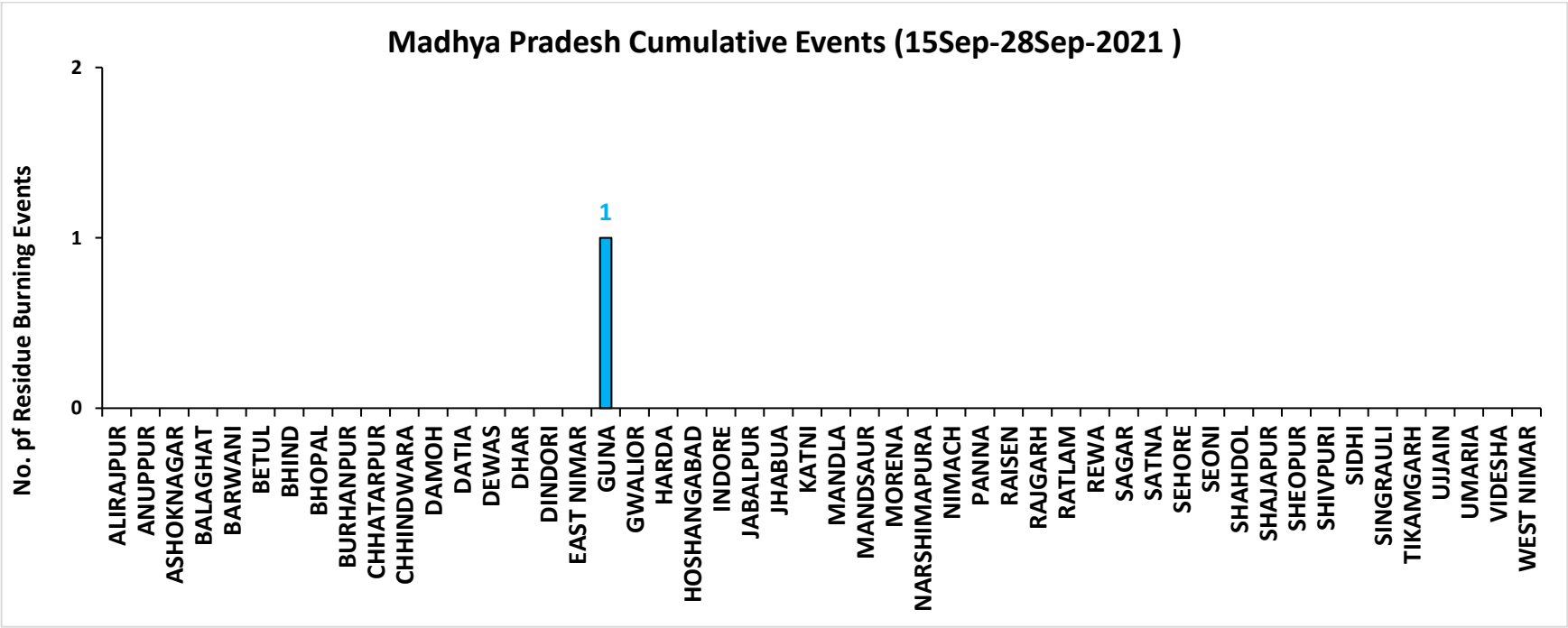
Fire Intensity (W/m2)

- 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 (15-28 Sep-2021)





District-wise cumulative number of residues burning events detected in 2020 and 2021

(Period: 15-28 September)

(a) Punjab

District	15 Sep - 28 Sep	
	2020	2021
AMRITSAR	646	100
BARNALA	1	0
BATHINDA	0	0
FARIDKOT	1	3
FATEHGARH SAHIB	0	0
FAZILKA	0	0
FIROZPUR	2	1
GURDASPUR	21	0
HOSHIARPUR	1	0
JALANDHAR	2	1
KAPURTHALA	8	0
LUDHIANA	12	2
MANSA	1	0
MOGA	4	0
MUKTSAR	1	0
PATHANKOT	0	0
PATIALA	19	4
RUPNAGAR	0	0
SANGRUR	3	1
SAS NAGAR (MOHALI)	5	0
SBS NAGAR	0	0
TARN TARAN	119	12
TOTAL	**846**	**124**

(b) Haryana

District	15 Sep - 28 Sep	
	2020	2021
AMBALA	4	0
BHIWANI	0	0
CHARKHI DADRI	0	0
FARIDABAD	0	0
FATEHABAD	4	0
GURGAON	0	0
HISAR	1	0
JHAJJAR	0	0
JIND	0	0
KAITHAL	5	0
KARNAL	20	0
KURUKSHETRA	8	0
MAHENDRAGARH	0	0
MEWAT	0	0
PALWAL	0	0
PANCHKULA	0	0
PANIPAT	3	0
REWARI	0	0
ROHTAK	0	0
SIRSA	1	0
SONIPAT	0	0
YAMUNANAGAR	1	1
Total	**47**	**1**

(c) Uttar Pradesh

District	15 Sep - 28 Sep							
	2020	2021	GAUTAMBUDHNAGAR	0	0	MUZAFARNAGAR	0	0
AGRA	0	0	GAZIPUR	0	0	PILHIBHIT	1	0
ALIGARH	1	0	GHAZIABAD	1	0	PRATAPGARH	0	0
ALLAHABAD	0	0	GONDA	0	0	RAIBEARELI	1	0
AMBEDKARNAGAR	0	0	GORAKHPUR	0	0	RAMPUR	0	2
AMETHI	0	0	HAMIRPUR	0	0	SAMBHAL	3	0
AMROHA	0	0	HAPUR	1	0	SANTKABIRNAGAR	0	0
AURAIYA	1	0	HARDOI	0	0	SANTRAVIDASNAGAR	0	0
AZAMGARH	0	0	HATHRAS	0	0	SHAHJAHANPUR	2	6
BADAUN	0	0	JALAUN	0	0	SHAMLI	6	0
BAGHPAT	1	0	JAUNPUR	0	0	SHARANPUR	1	0
BAHRAICH	0	0	JHANSI	2	0	SHRAWASTI	0	0
BALLIA	0	0	KANNAUJ	0	0	SIDDHARTHNAGAR	0	0
BALRAMPUR	0	0	KANPUR	0	1	SITAPUR	0	0
BANDA	0	0	KANPUR DEHAT	0	0	SONBHADRA	0	0
BARABANKI	0	0	KASGANJ	0	0	SULTANPUR	0	0
BAREILLY	0	0	KAUSHAMBI	0	0	UNNAO	0	0
BASTI	0	0	KHERI	0	0	VARANASI	0	0
BIJNOR	1	0	KUSHINAGAR	0	0	Total	**25**	**10**
BULANDSAHAR	0	0	LALITPUR	0	0			
CHANDAULI	0	0	LUCKNOW	0	0			
CHITRAKOOT	0	0	MAHARAJGANJ	0	0			
DEORIA	0	0	MAHOBA	0	0			
ETAH	1	0	MAINPURI	0	0			
ETAWAH	0	0	MATHURA	0	1			
FAIZABAD	0	0	MAU	0	0			
FARRUKHABAD	0	0	MEERUT	2	0			
FATEHPUR	0	0	MIRZAPUR	0	0			
FIROZABAD	0	0	MORADABAD	0	0			

(d) Madhya Pradesh

District	15 Sep - 28 Sep	
	2020	2021
ALIRAJPUR	0	0
ANUPPUR	0	0
ASHOKNAGAR	0	0
BALAGHAT	0	0
BARWANI	0	0
BETUL	0	0
BHIND	0	0
BHOPAL	0	0
BURHANPUR	0	0
CHHATARPUR	0	0
CHHINDWARA	0	0
DAMOH	0	0
DATIA	0	0
DEWAS	0	0
DHAR	0	0
DINDORI	0	0
EAST NIMAR	0	0
GUNA	2	1
GWALIOR	2	0
HARDA	2	0
HOSHANGABAD	0	0
INDORE	0	0
JABALPUR	0	0
JHABUA	0	0
KATNI	0	0
MANDLA	0	0
MANDSAUR	0	0
MORENA	0	0
NARSHIMAPURA	0	0
NIMACH	0	0
PANNA	0	0
RAISEN	0	0
RAJGARH	0	0
RATLAM	0	0
REWA	0	0
SAGAR	2	0
SATNA	0	0
SEHORE	0	0
SEONI	0	0
SHAHDOL	0	0
SHAJAPUR	0	0
SHEOPUR	0	0
SHIVPURI	0	0
SIDHI	0	0
SINGRAULI	0	0
TIKAMGARH	0	0
UJJAIN	0	0
UMARIA	0	0
VIDESHA	0	0
WEST NIMAR	0	0
Total	**8**	**1**

State-wise and date-wise number of paddy residue burning events detected in 2020 and 2021

(Period: 15 - 28 September)

Number of Paddy Residue Burning Events Detected												
	Punjab		Haryana		Uttar Pradesh		Delhi		Rajasthan		Madhya Pradesh	
	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021
15-Sep	5	0	2	0	1	0	0	0	1	0	2	0
16-Sep	0	2	1	0	0	0	0	0	0	0	0	0
17-Sep	5	0	3	0	0	0	0	0	0	0	0	0
18-Sep	17	9	0	0	0	1	0	0	0	0	0	0
19-Sep	30	5	2	0	0	1	0	0	0	0	0	0
20-Sep	67	8	6	0	2	0	0	0	0	0	0	0
21-Sep	54	0	2	0	1	0	0	0	1	0	2	0
22-Sep	34	0	1	0	1	0	0	0	0	0	0	0
23-Sep	49	0	0	0	1	0	0	0	1	0	0	0
24-Sep	78	5	0	0	1	1	0	0	0	0	0	0
25-Sep	184	11	11	0	5	0	0	0	1	0	0	0
26-Sep	190	19	5	0	8	0	0	0	1	0	2	0
27-Sep	78	37	8	0	4	1	0	0	0	0	1	0
28-Sep	55	28	6	1	1	6	0	0	0	0	1	1
Total	**846**	**124**	**47**	**1**	**25**	**10**	**0**	**0**	**5**	**0**	**8**	**1**

Details of residue burning events in Punjab on 28-Sep-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	AMRITSAR	AJNALA	S-NPP	31.81310	74.90720	9/28/2021	13:41:51	D	3.70
2	AMRITSAR	ATTARI	S-NPP	31.58000	74.76690	9/28/2021	13:41:51	D	5.00
3	AMRITSAR	CHOGAWAN	S-NPP	31.71850	74.56350	9/28/2021	13:41:51	D	2.50
4	AMRITSAR	HARSHA CHHINA	S-NPP	31.81050	74.91090	9/28/2021	13:41:51	D	3.90
5	AMRITSAR	JANDIALA GURU	S-NPP	31.58290	75.09470	9/28/2021	13:41:51	D	4.50
6	AMRITSAR	JANDIALA GURU	S-NPP	31.60470	75.06710	9/28/2021	13:41:51	D	8.00
7	AMRITSAR	JANDIALA GURU	S-NPP	31.61220	74.99110	9/28/2021	13:41:51	D	3.00
8	AMRITSAR	JANDIALA GURU	S-NPP	31.63340	75.01590	9/28/2021	13:41:51	D	3.10
9	AMRITSAR	JANDIALA GURU	S-NPP	31.65740	74.97850	9/28/2021	13:41:51	D	3.60
10	AMRITSAR	MAJITHA	S-NPP	31.72430	74.99710	9/28/2021	13:41:51	D	8.30
11	AMRITSAR	MAJITHA	S-NPP	31.73780	74.93300	9/28/2021	13:41:51	D	13.10
12	AMRITSAR	MAJITHA	S-NPP	31.74840	75.01660	9/28/2021	13:41:51	D	5.50
13	AMRITSAR	MAJITHA	S-NPP	31.80780	74.97300	9/28/2021	13:41:51	D	3.20
14	AMRITSAR	MAJITHA	S-NPP	31.81500	75.00040	9/28/2021	13:41:51	D	3.80
15	AMRITSAR	RAYYA	S-NPP	31.57130	75.23100	9/28/2021	13:41:51	D	3.60
16	AMRITSAR	TARSIKKA	S-NPP	31.62750	75.15880	9/28/2021	13:41:51	D	2.40
17	AMRITSAR	TARSIKKA	S-NPP	31.62980	75.15980	9/28/2021	13:41:51	D	2.40
18	AMRITSAR	TARSIKKA	S-NPP	31.68720	75.18360	9/28/2021	13:41:51	D	3.00
19	AMRITSAR	TARSIKKA	S-NPP	31.70440	75.14700	9/28/2021	13:41:51	D	2.90
20	AMRITSAR	VERKA	S-NPP	31.64210	74.97170	9/28/2021	13:41:51	D	2.50
21	AMRITSAR	VERKA	S-NPP	31.67270	74.98530	9/28/2021	13:41:51	D	1.80
22	FIROZPUR	GHALL KHURD	S-NPP	30.96530	74.76130	9/28/2021	13:41:51	D	3.70
23	JALANDHAR	LOHIAN	S-NPP	31.10260	75.18480	9/28/2021	13:41:51	D	5.50
24	LUDHIANA	MACHHIWARA	S-NPP	30.83920	76.29540	9/28/2021	13:41:51	D	4.60
25	PATIALA	PATRAN	S-NPP	29.89250	76.06290	9/28/2021	13:41:51	D	3.60
26	TARN TARAN	KHADUR SAHIB	S-NPP	31.44180	75.06040	9/28/2021	13:41:51	D	3.20
27	TARN TARAN	KHADUR SAHIB	S-NPP	31.48570	75.23420	9/28/2021	13:41:51	D	3.90
28	TARN TARAN	KHADUR SAHIB	S-NPP	31.50060	75.04070	9/28/2021	13:41:51	D	3.70

Details of residue burning events in Haryana on 28-Sep-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	YAMUNANAGAR	MUSTAFABAD	S-NPP	30.24380	77.21640	9/28/2021	13:41:51	D	3.80

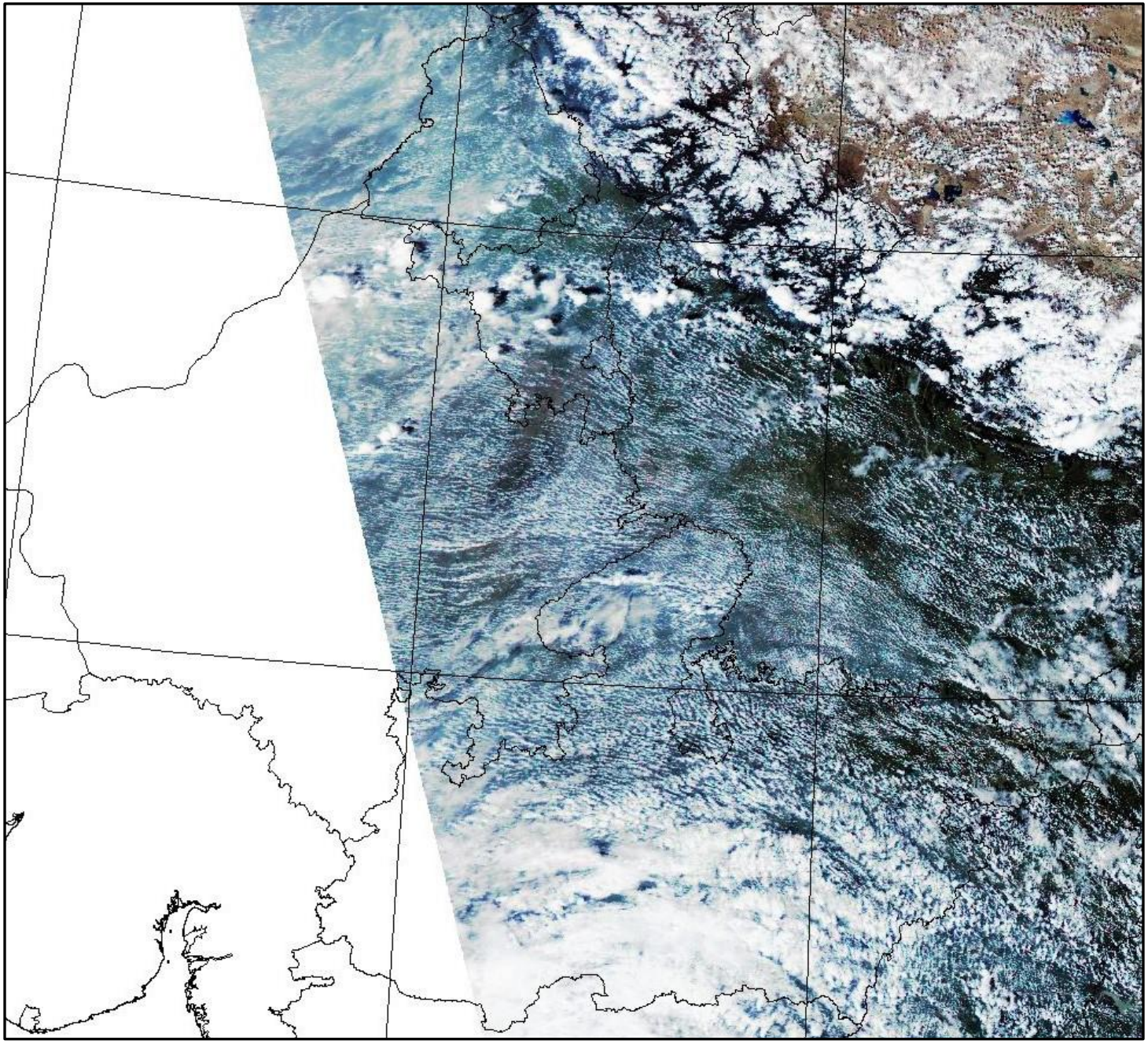
Details of residue burning events in Uttar Pradesh on 28-Sep-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	RAMPUR	TANDA	S-NPP	28.93000	78.98610	9/28/2021	02:31:52	N	1.30
2	SHAHJAHANPUR	PUWANYA	S-NPP	28.16810	80.22210	9/28/2021	13:41:51	D	3.00
3	SHAHJAHANPUR	PUWANYA	S-NPP	28.23440	80.15780	9/28/2021	13:41:51	D	6.60
4	SHAHJAHANPUR	PUWANYA	S-NPP	28.23650	80.15590	9/28/2021	13:41:51	D	5.00
5	SHAHJAHANPUR	PUWANYA	S-NPP	28.23700	80.16090	9/28/2021	13:41:51	D	5.00
6	SHAHJAHANPUR	PUWANYA	AQUA	28.13200	80.10400	9/28/2021	13:01:50	D	12.60

Details of residue burning events in Madhya Pradesh on 28-Sep-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m2)
1	GUNA	RAGHOGARH	S-NPP	24.48370	77.14560	9/28/2021	02:31:52	N	0.60

AQUA (MODIS) Satellite image (TCC) of North and Central India Acquired on 28-Sep-2021 at 12:59:20 IST by IARI Ground Station



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

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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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