



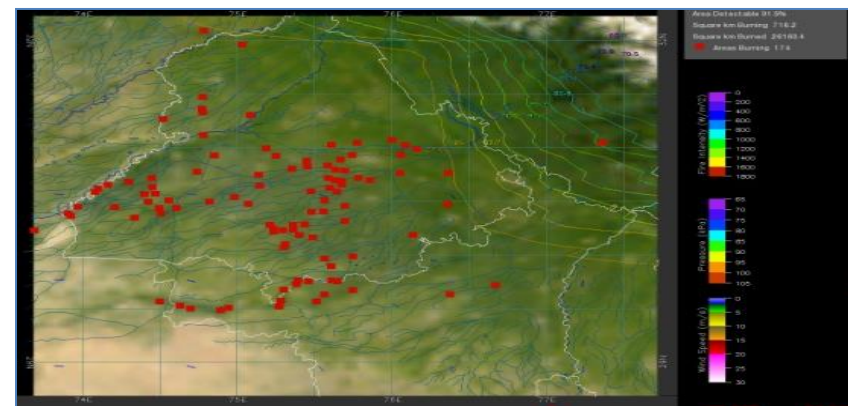
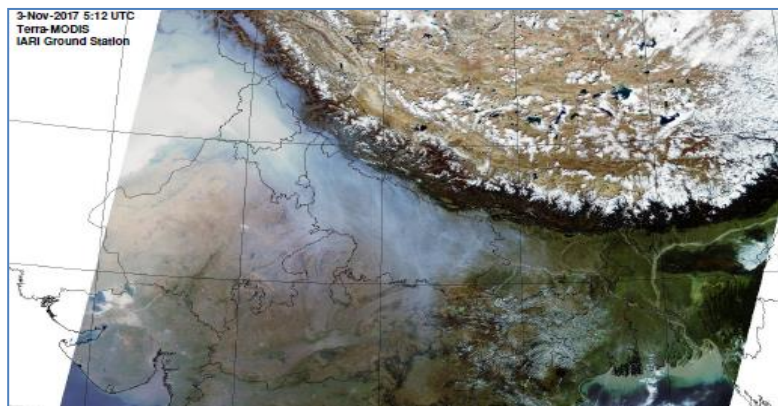
**Bulletin
No. 19**

**Events Date:
03-Oct-2023**

**Issued on:
03-Oct-2023**



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



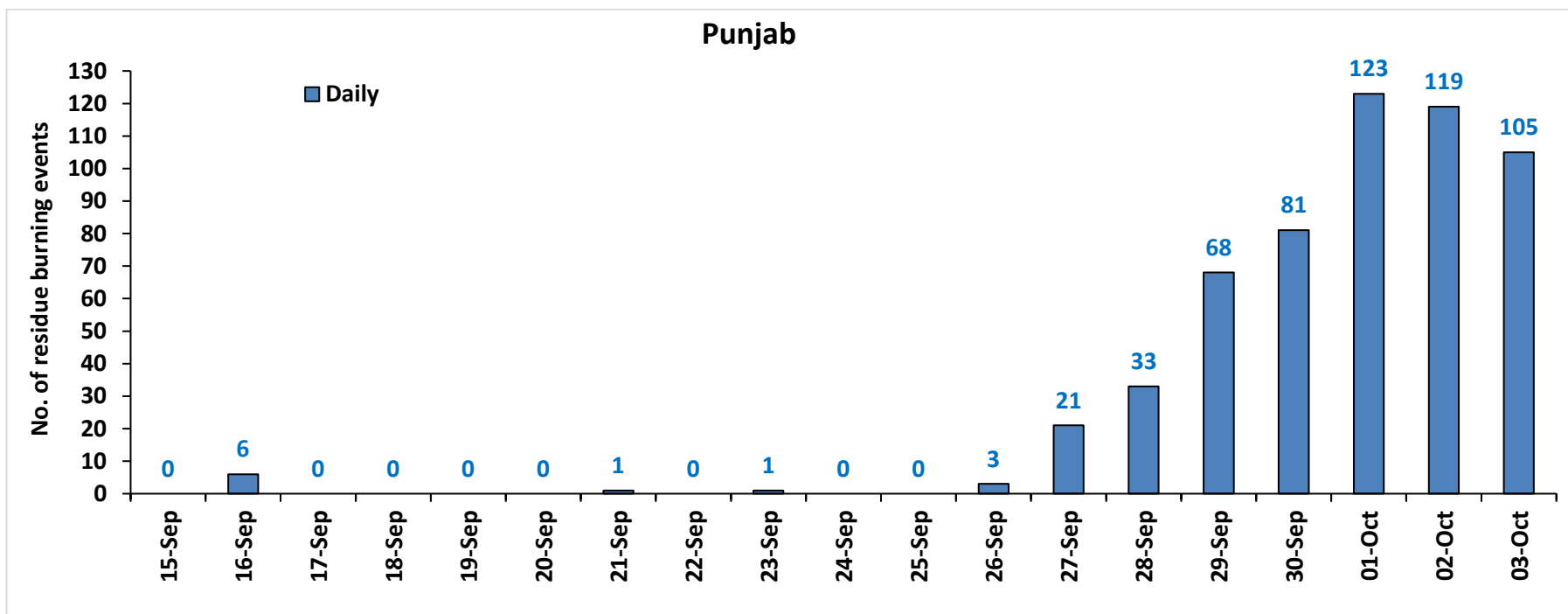
**Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012**

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

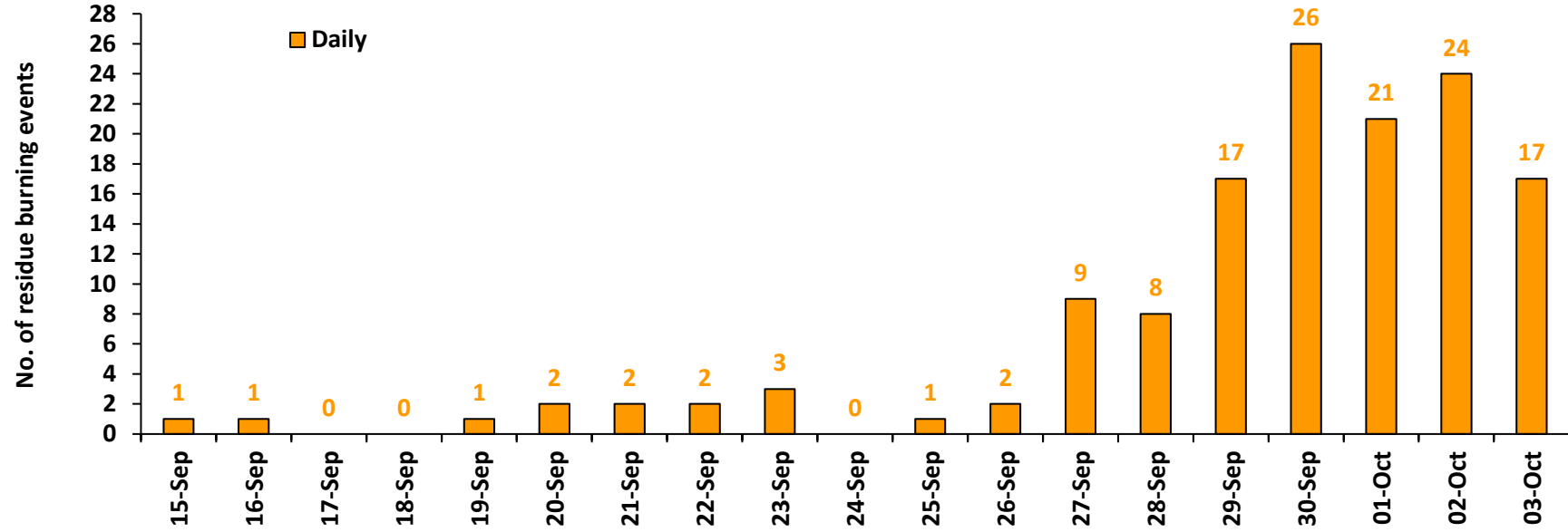
Highlights for 03-Oct-2023

- 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 **140** residue burning events in the six study States on 03-Oct-2023.
- The state wise events detected on 03-Oct-2023 were **105** in Punjab, **17** in Haryana, **08** in UP, **00** in Delhi, **05** in Rajasthan and **05** in MP.
- Total **822** burning events were detected in the six states between 15-Sept-2023 and 03-Oct-2023, which are distributed as **561**, **137**, **65**, **01**, **23** and **35** in Punjab, Haryana, UP, Delhi, Rajasthan and MP, respectively.
- Detection of residue burning events was hampered by the presence of clouds over eastern Uttar Pradesh and eastern Madhya Pradesh states.

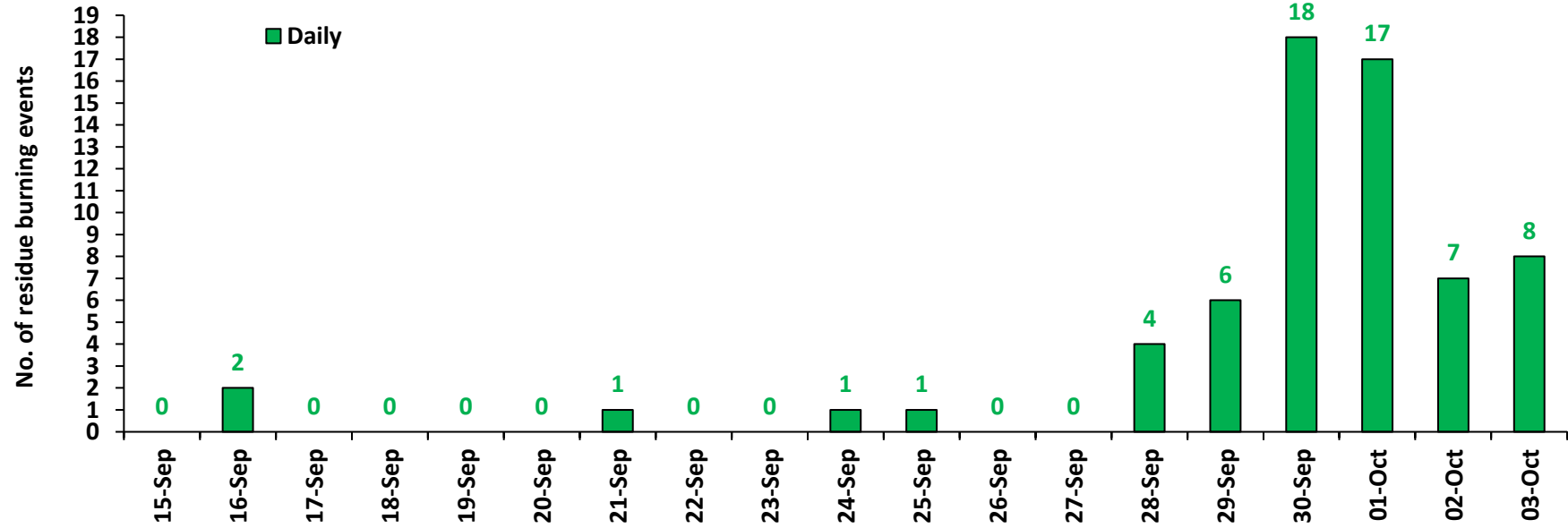
Temporal distribution of rice residue burning events for the study States in 2023

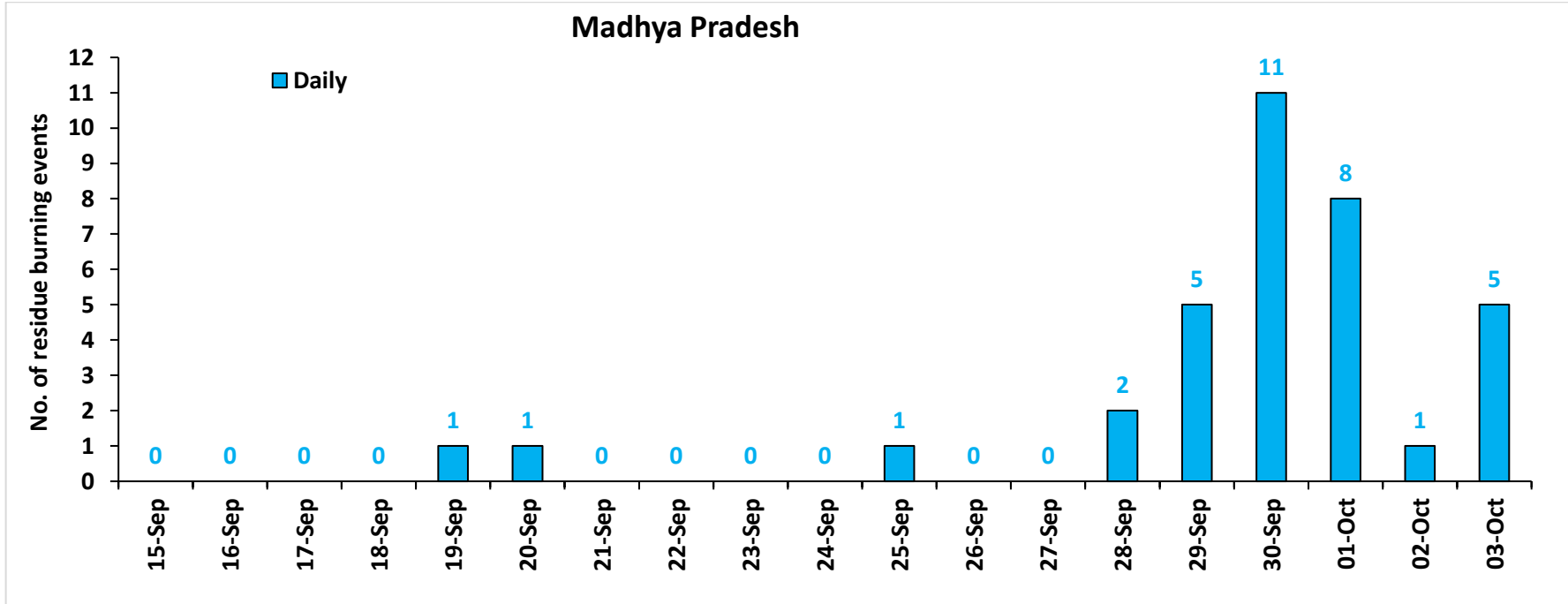
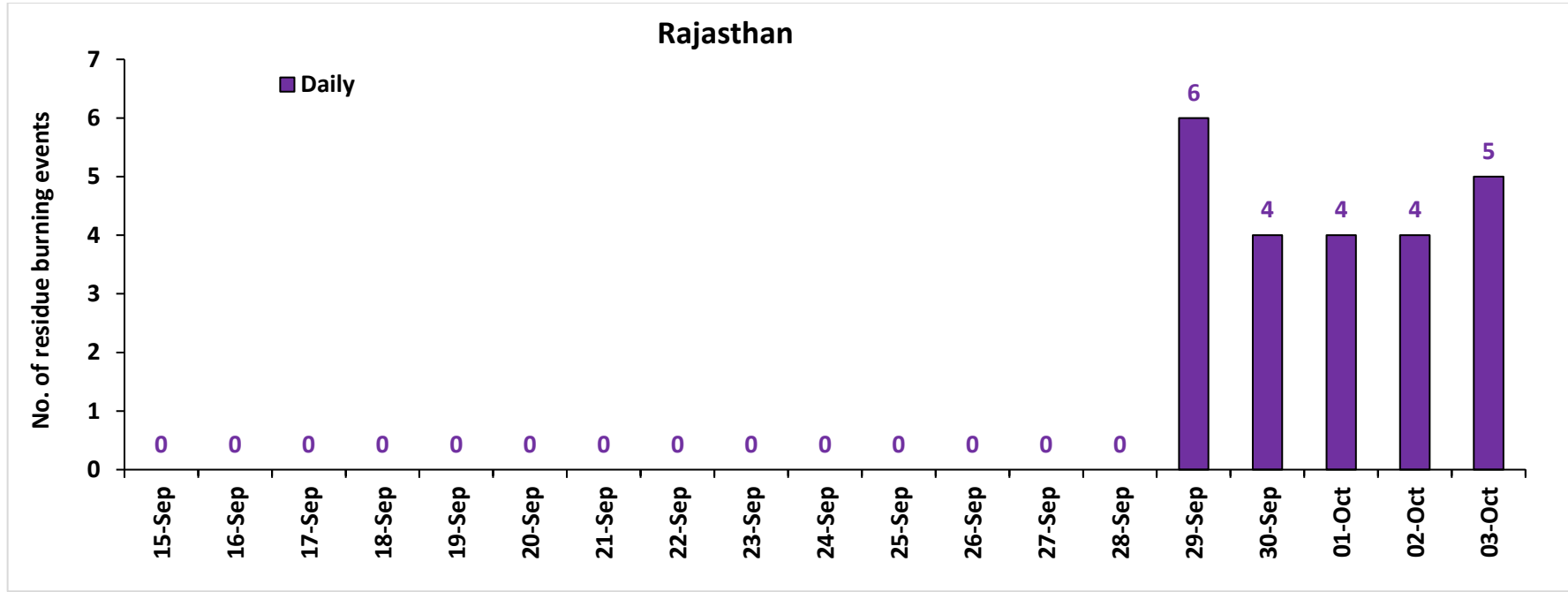


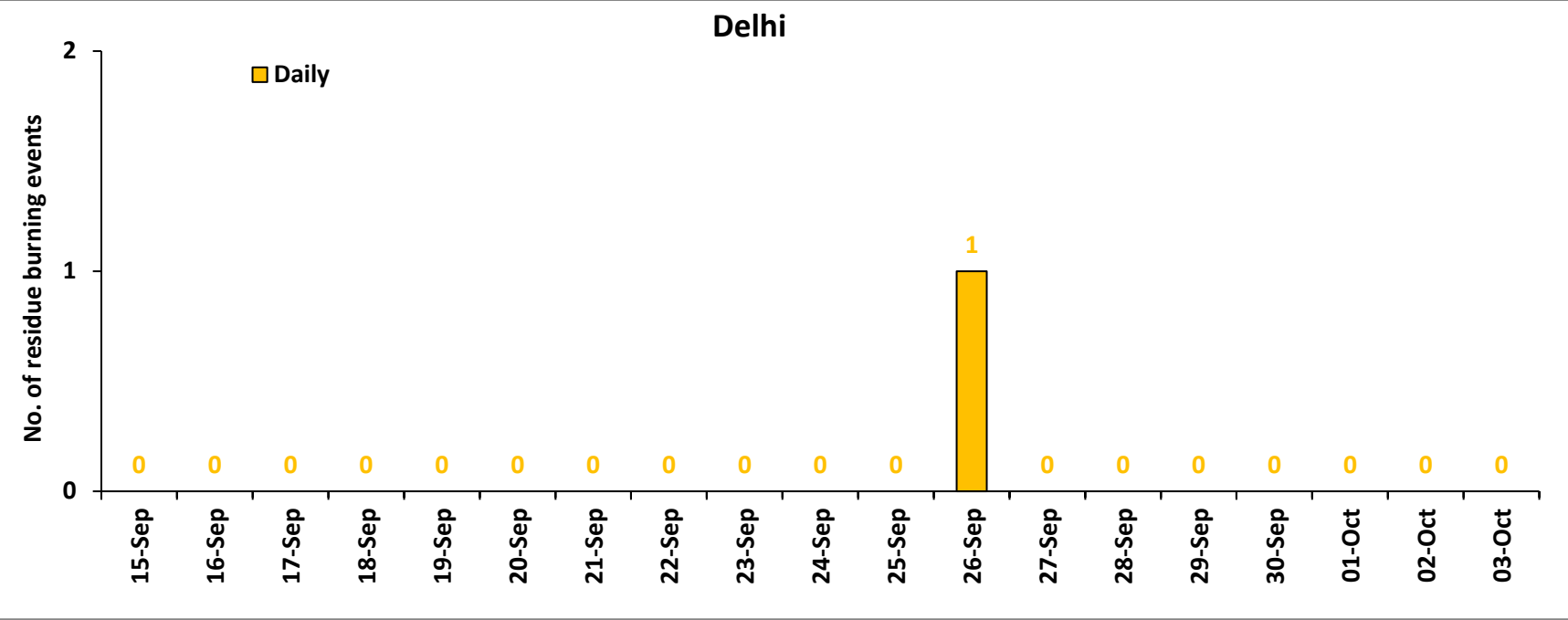
Haryana



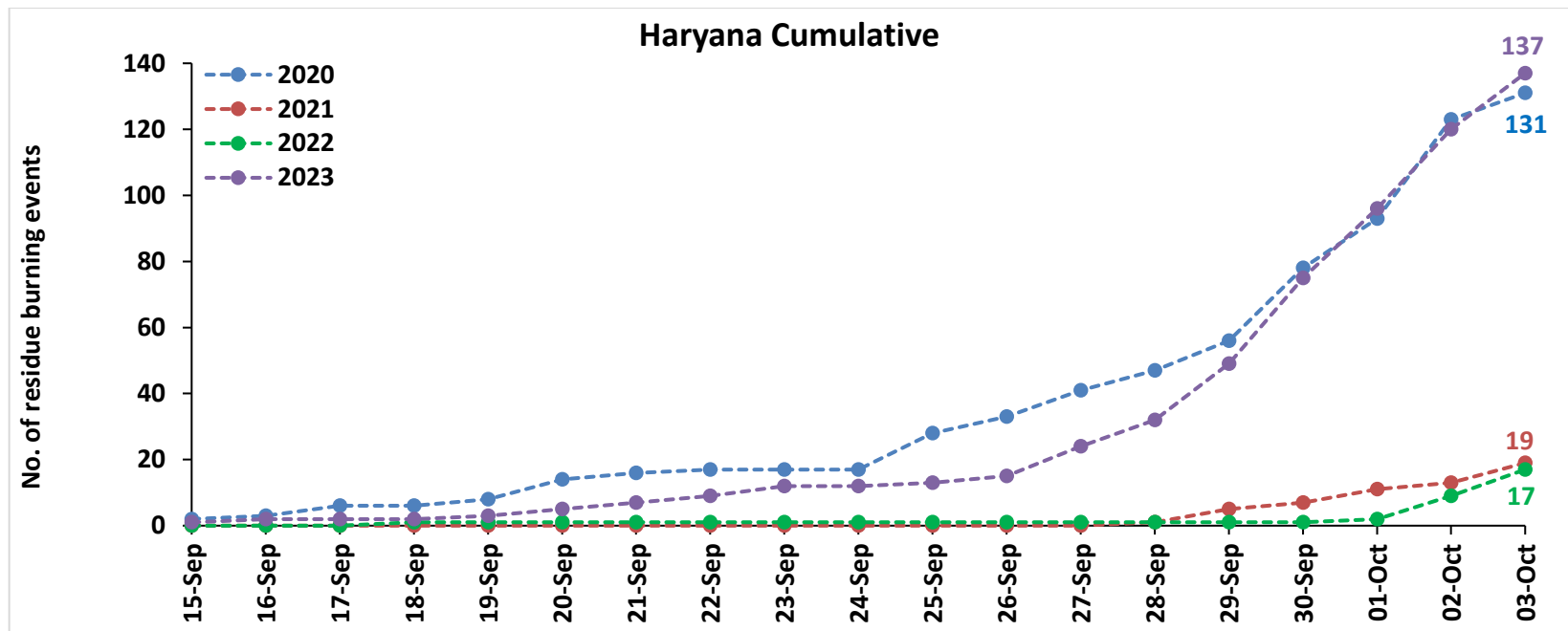
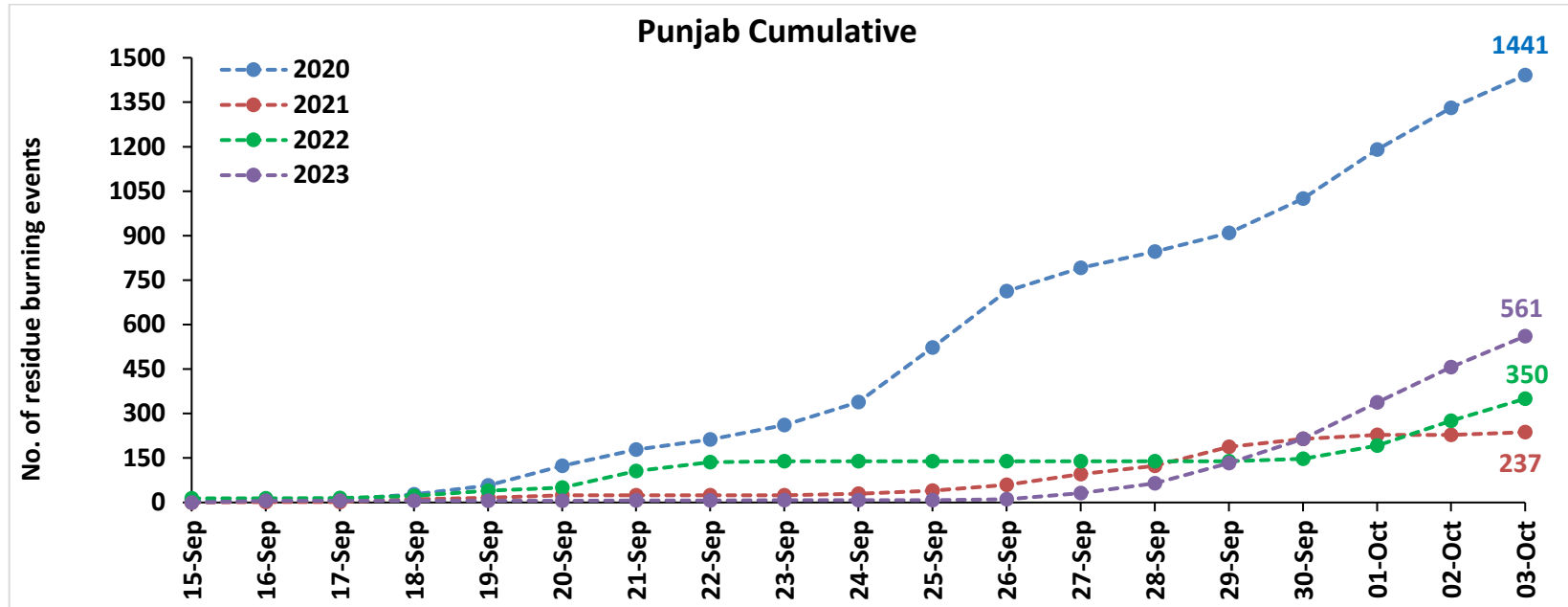
Uttar Pradesh

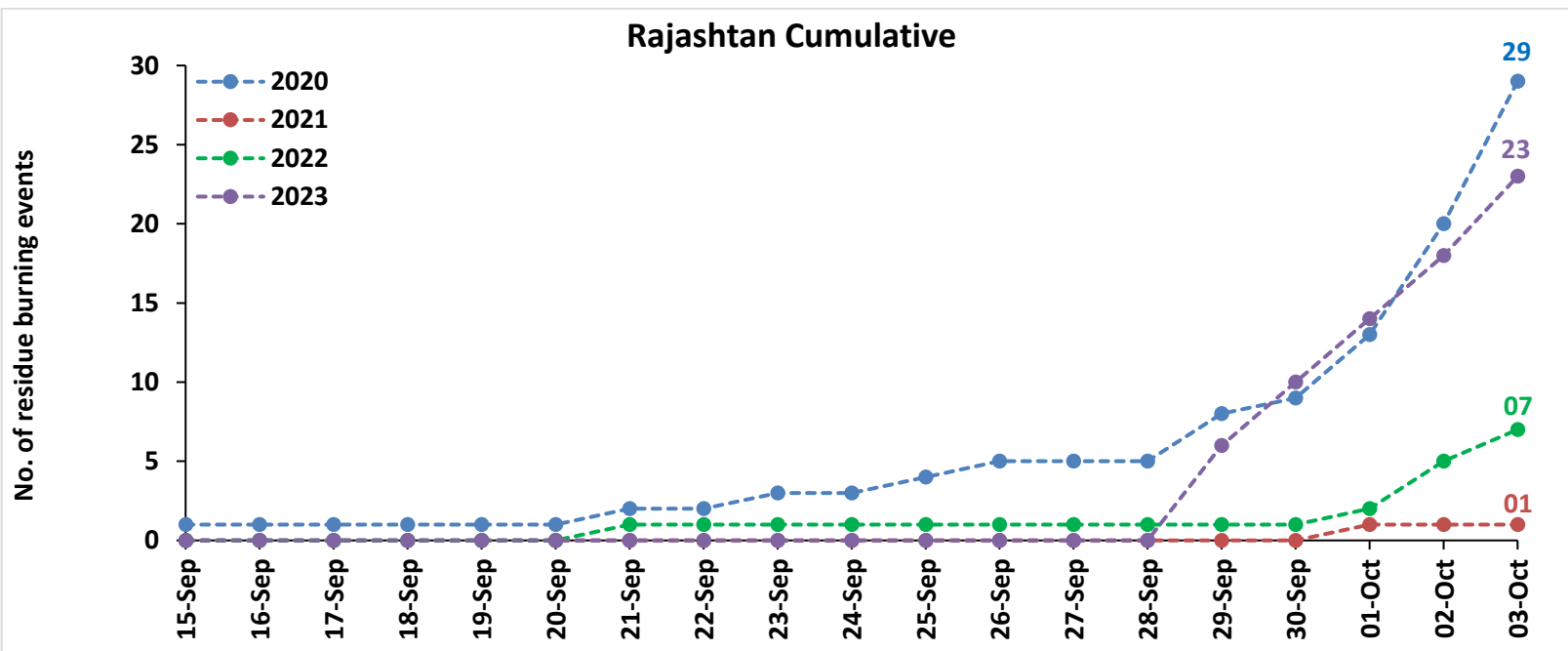
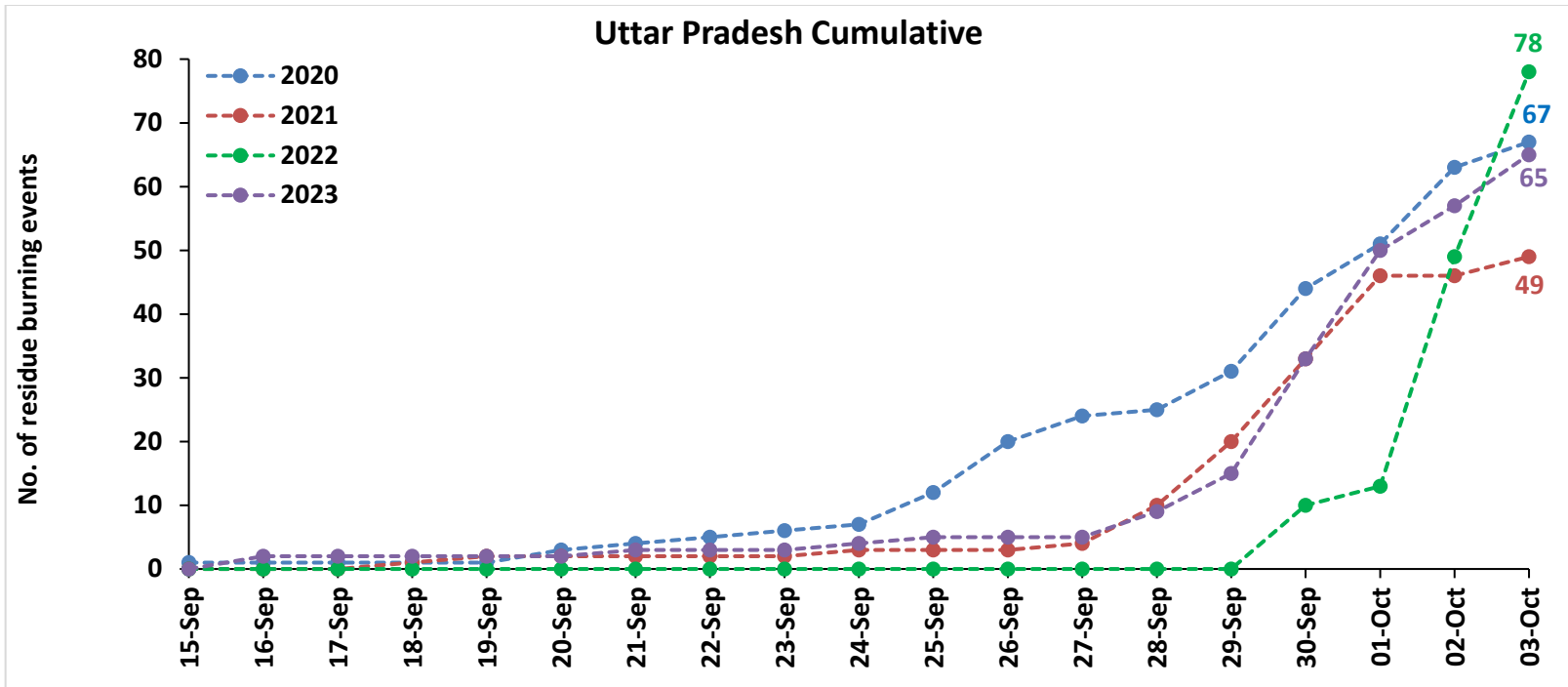




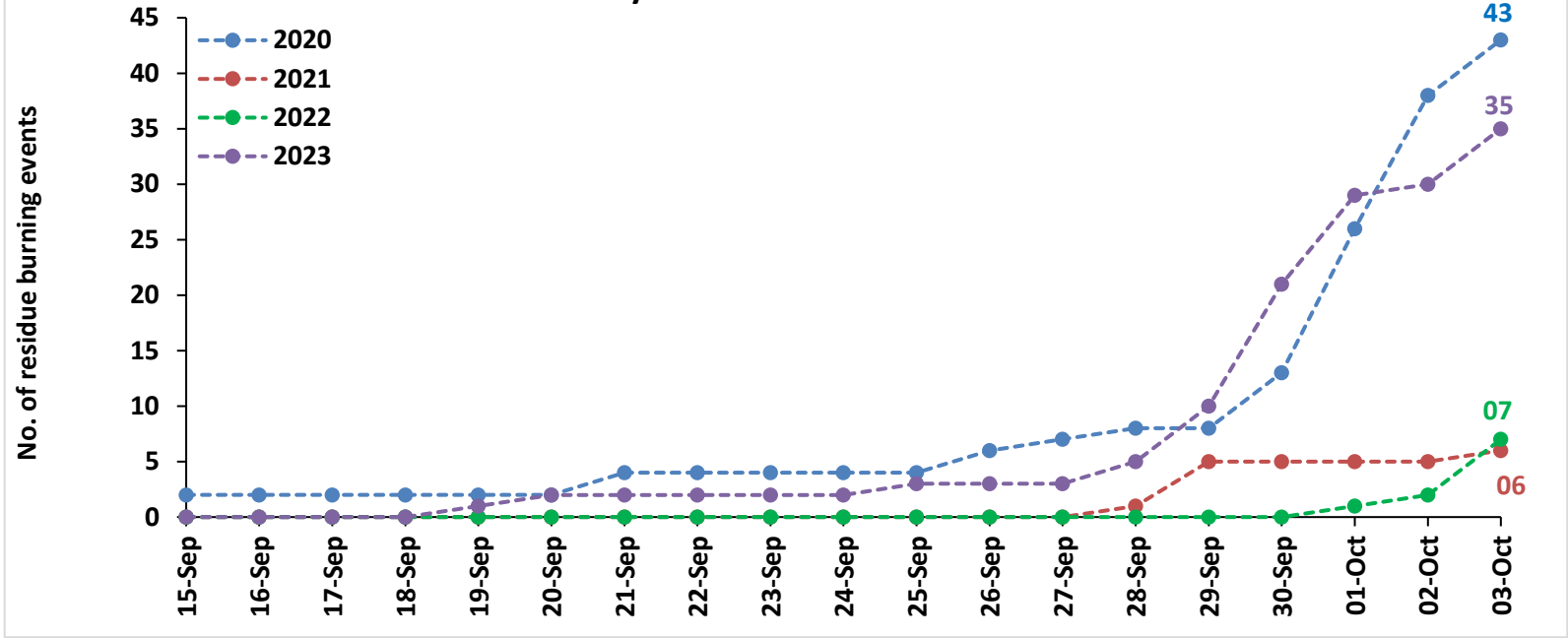


Comparison of residue burning events in current year (2023) with previous years (2020, 2021 and 2022) for the study State

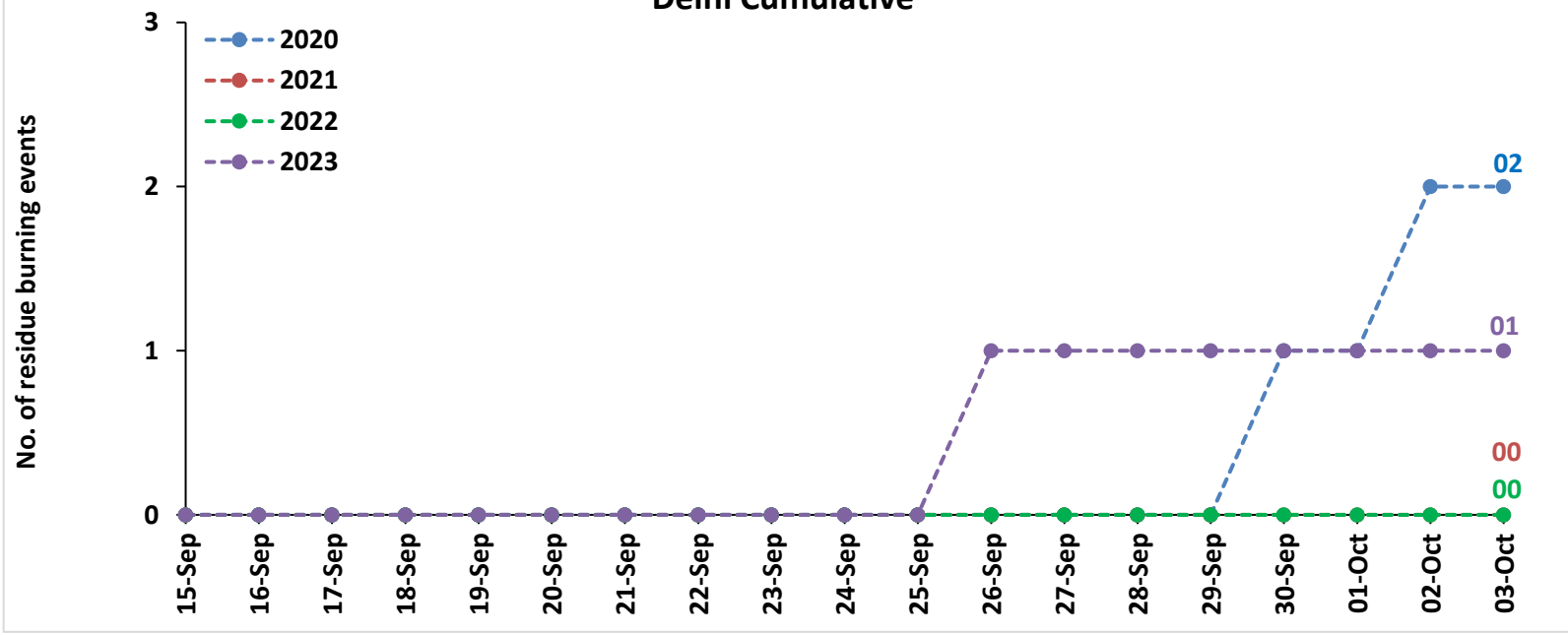




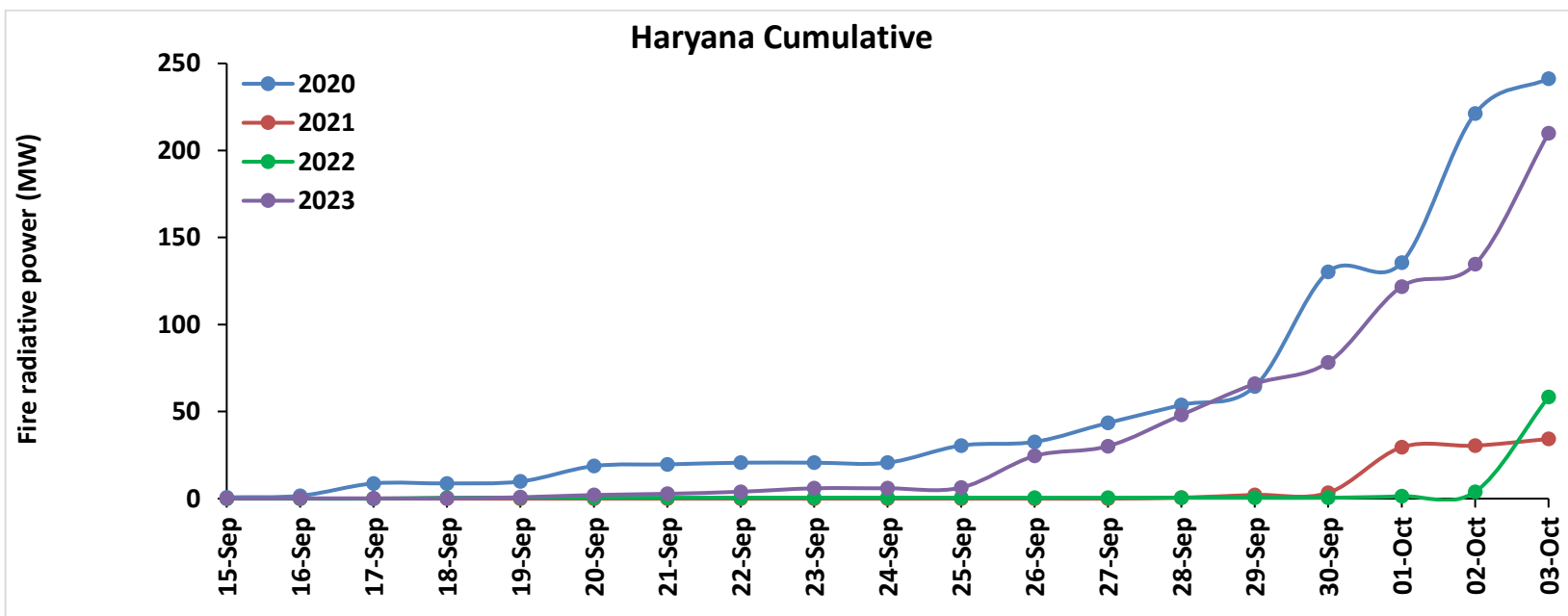
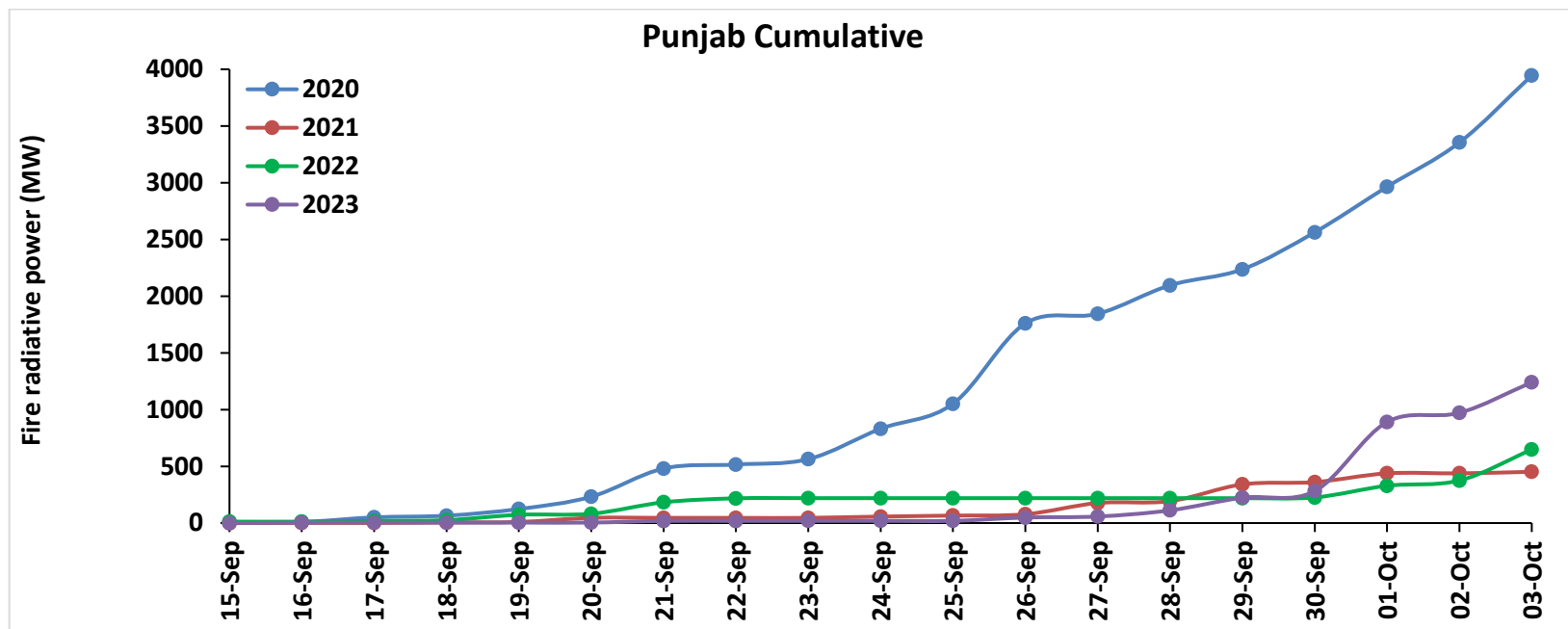
Madhya Pradesh Cumulative

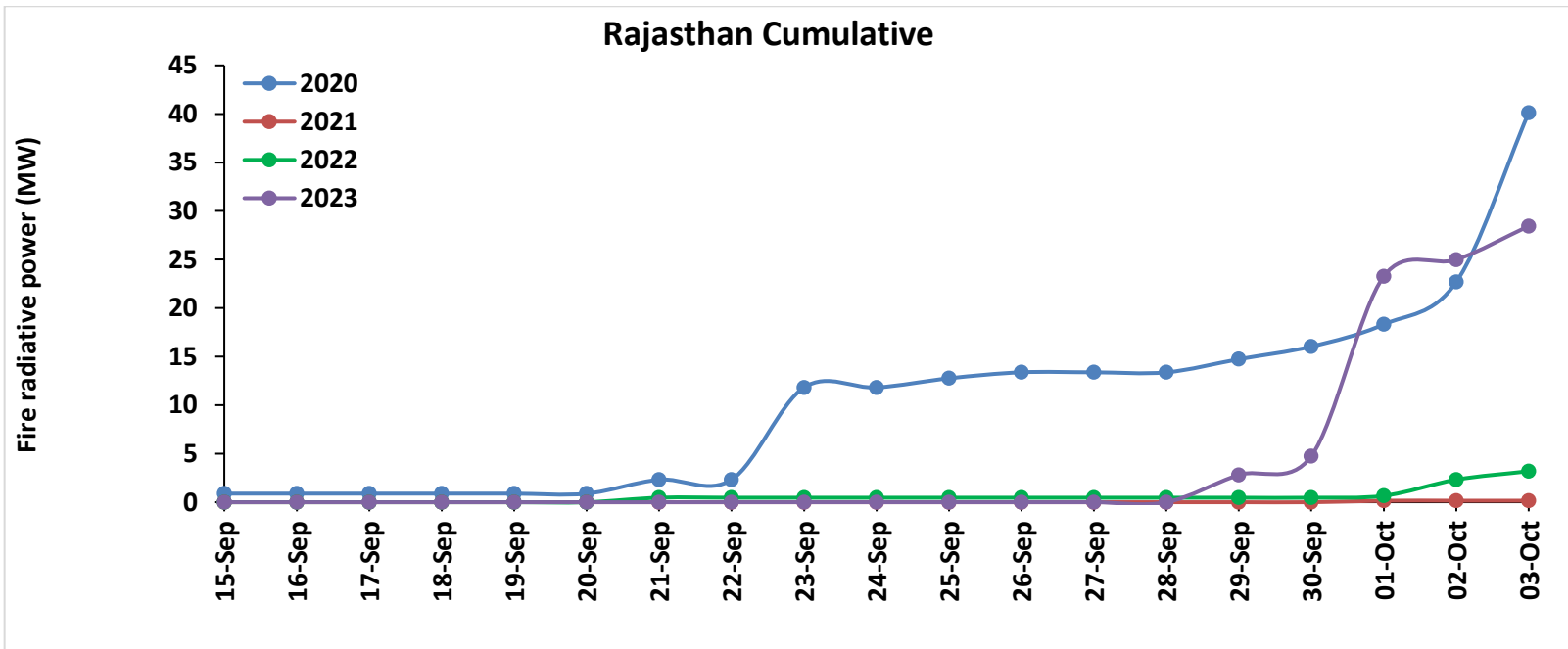
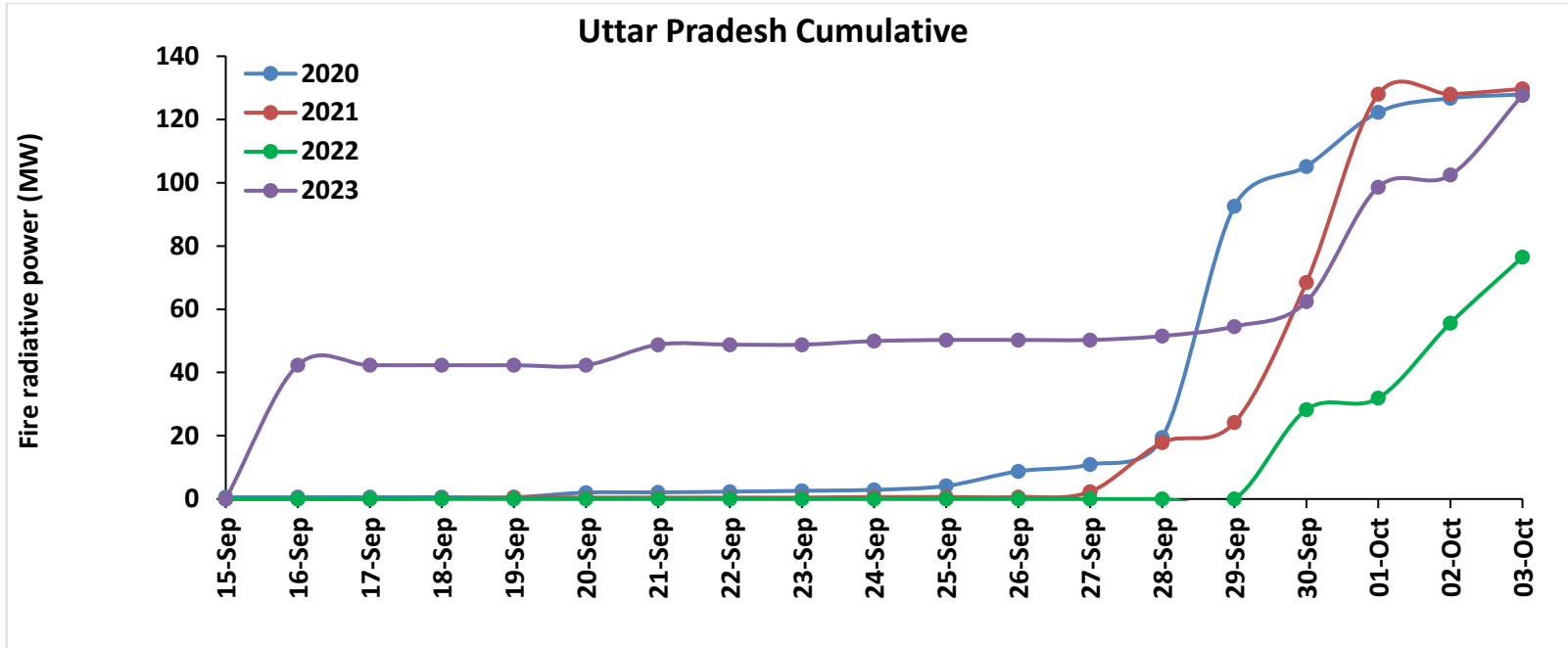


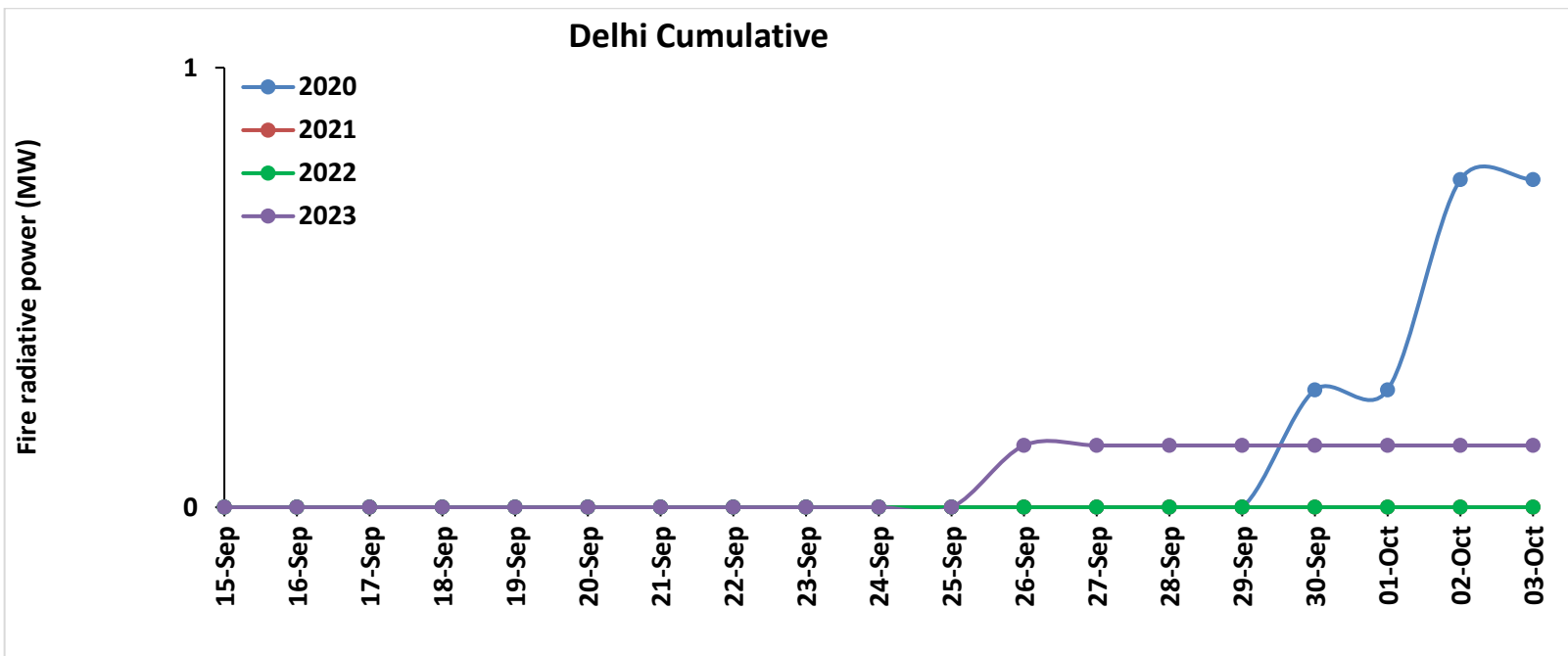
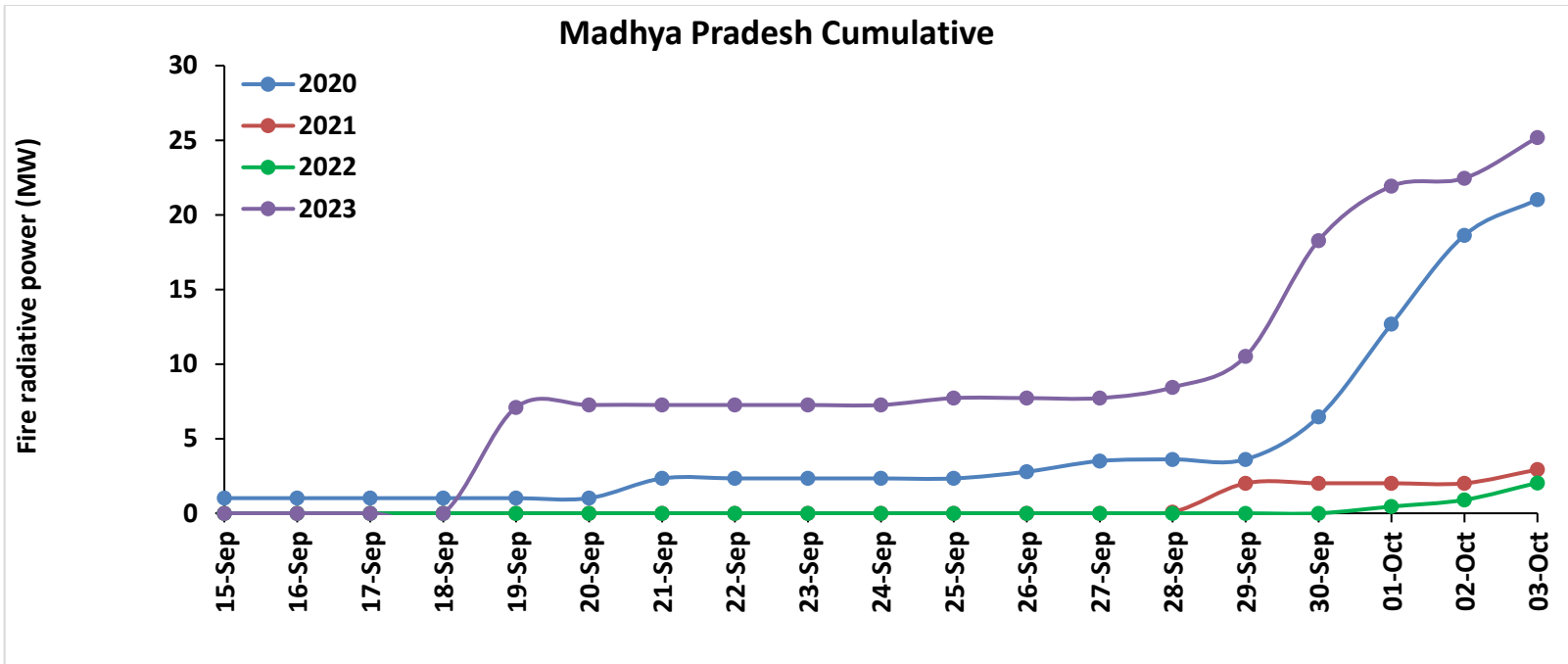
Delhi Cumulative



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

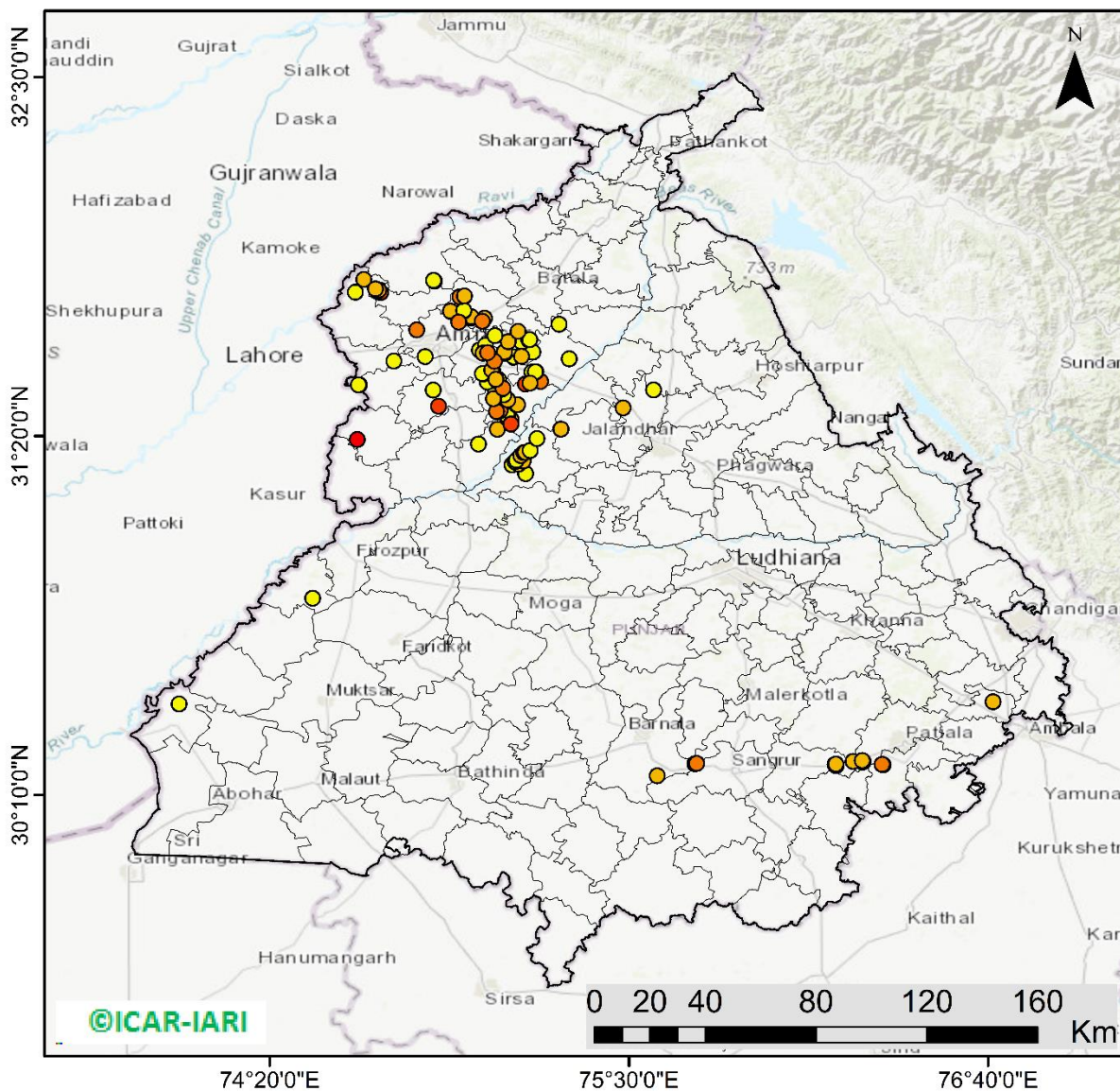






Punjab

RICE RESIDUE BURNING IN PUNJAB



105 burning events
detected in Punjab during
(03rd Oct 2023)

Fire Intensity (W/m²)

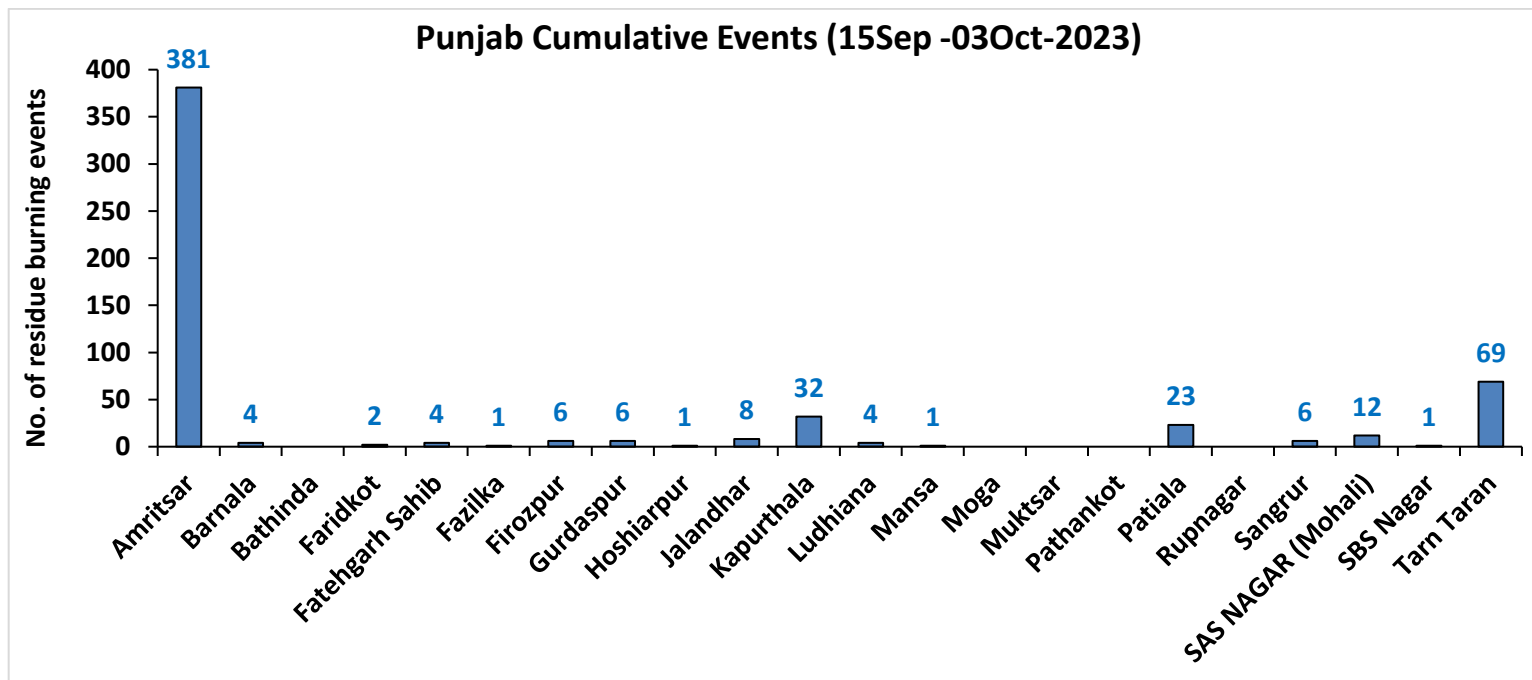
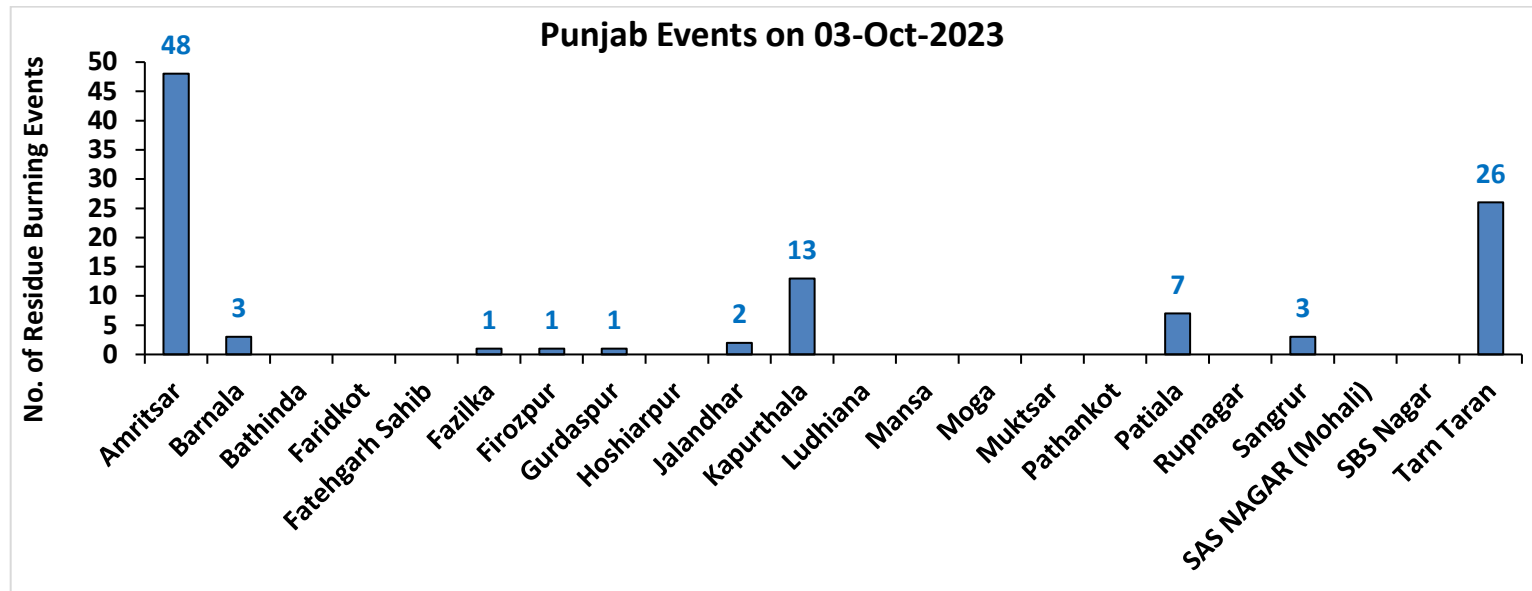
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



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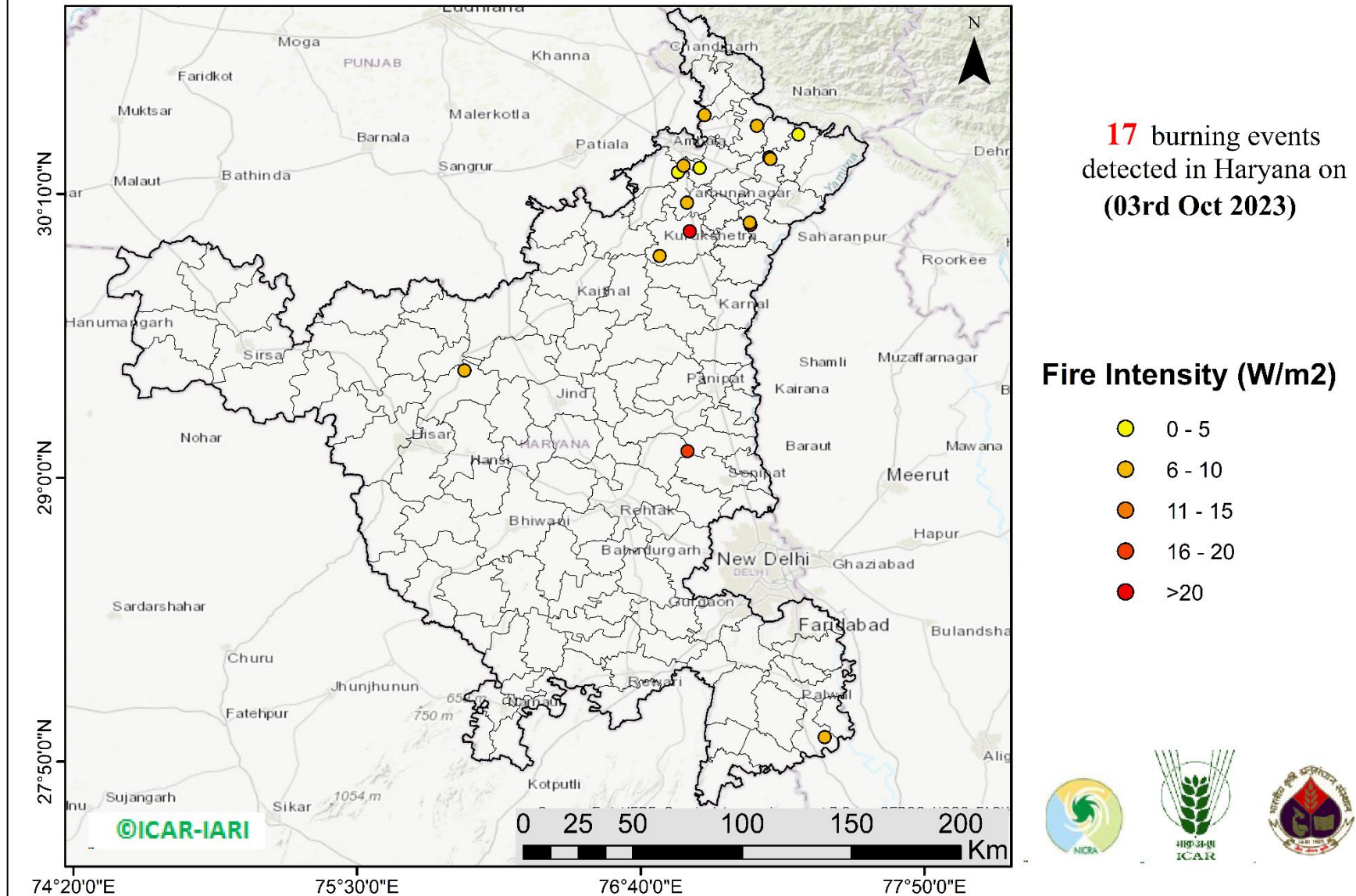
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Punjab (15Sep- 03Oct-2023)

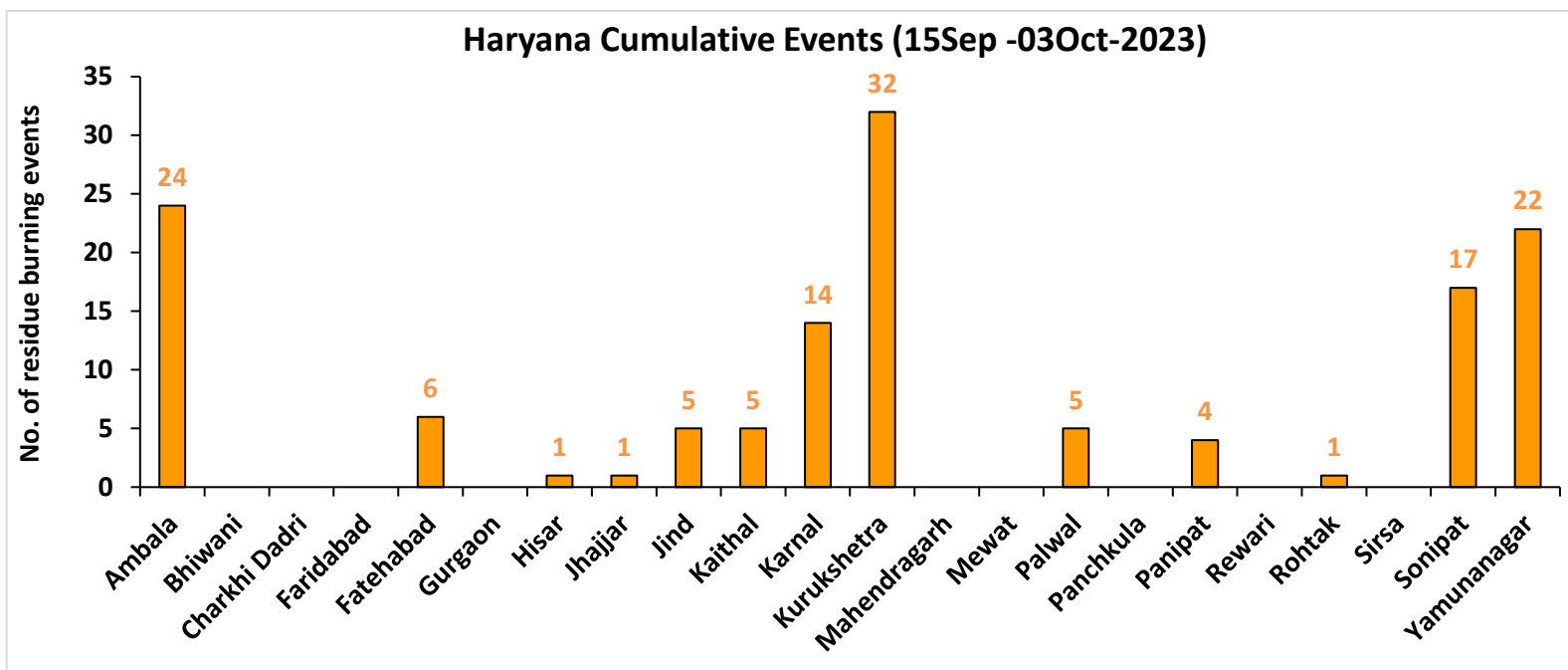
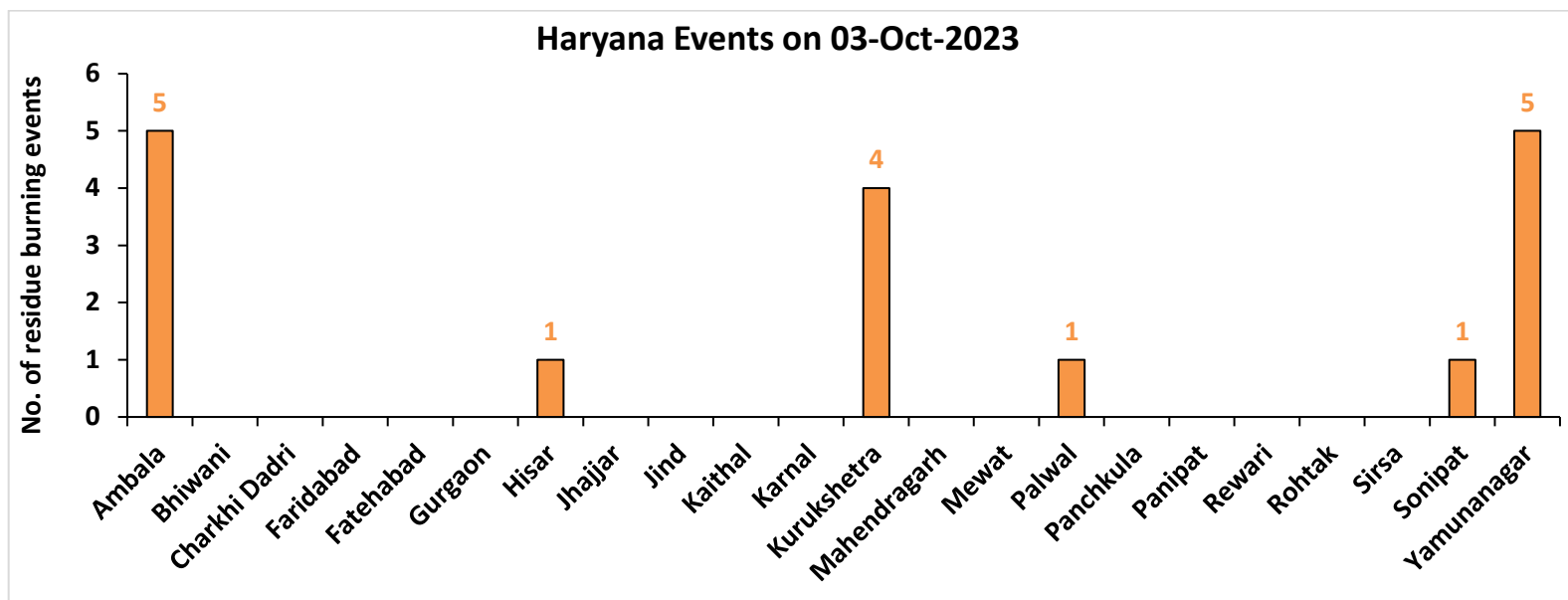


Haryana

RICE RESIDUE BURNING IN HARYANA

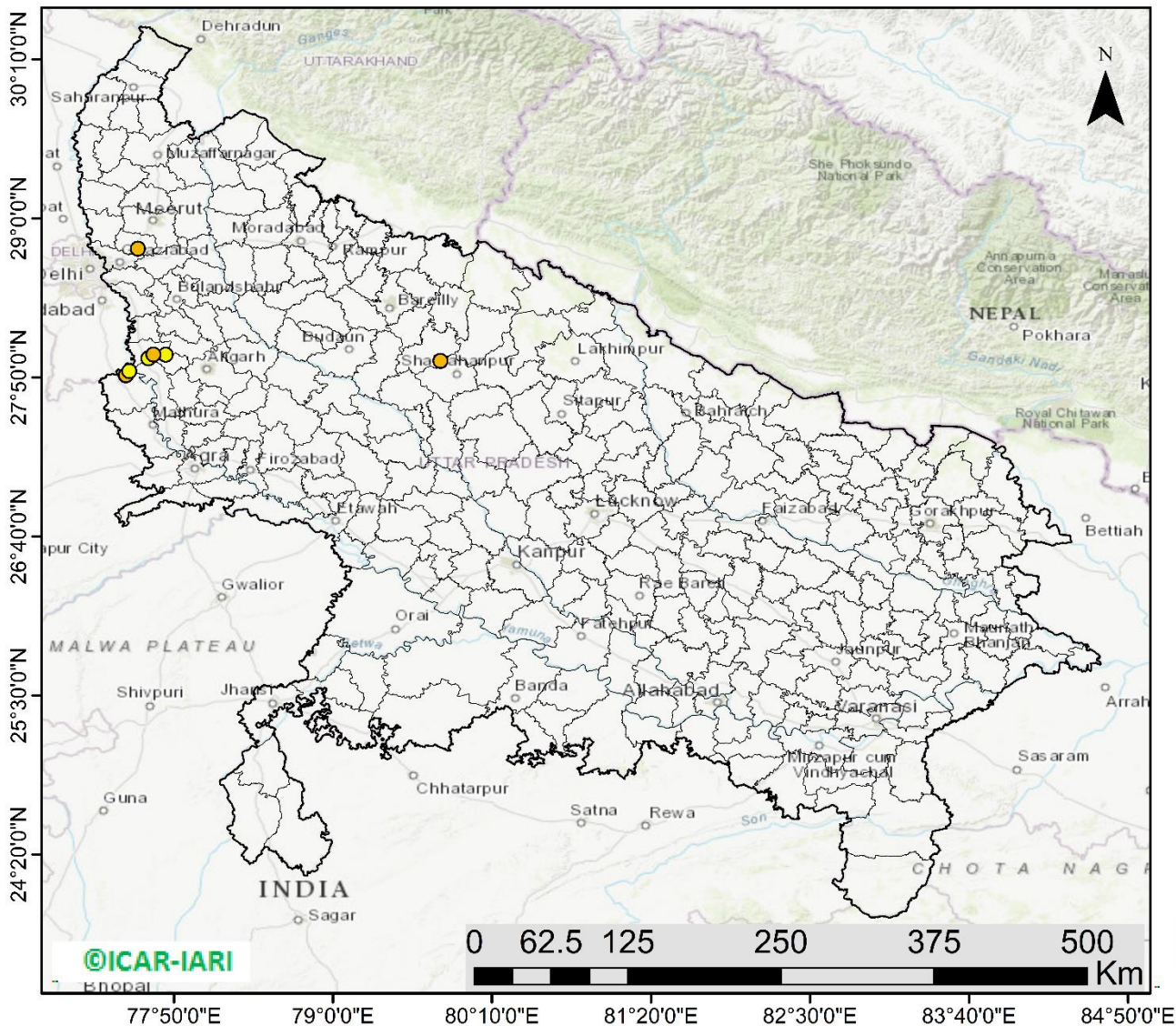


District-wise cumulative number of residues burning events in Haryana (15Sep-03Oct -2023)



Uttar Pradesh

RICE RESIDUE BURNING IN UTTAR PRADESH



08 burning events detected in Uttar Pradesh on (03rd Oct 2023)

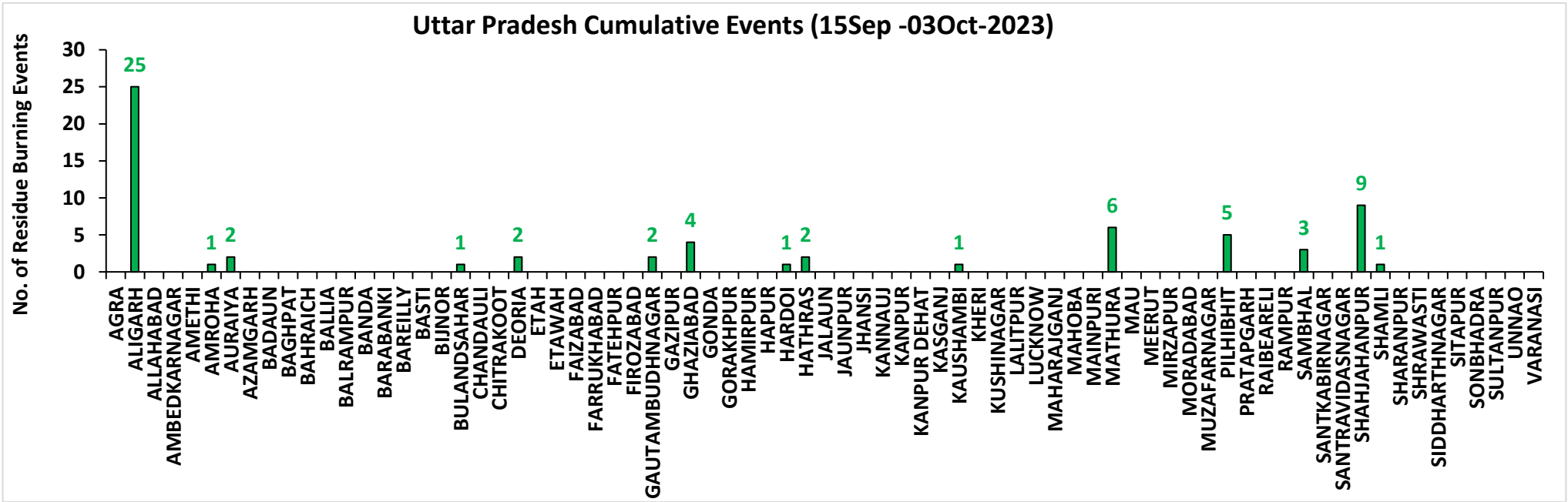
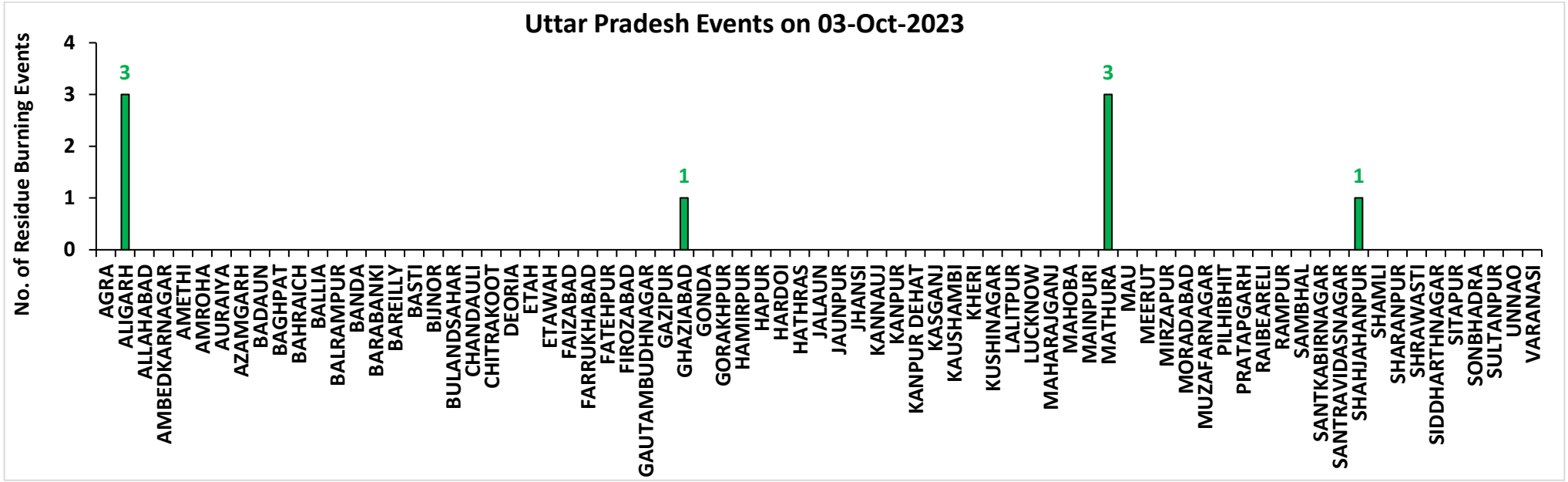
Fire Intensity (W/m²)

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



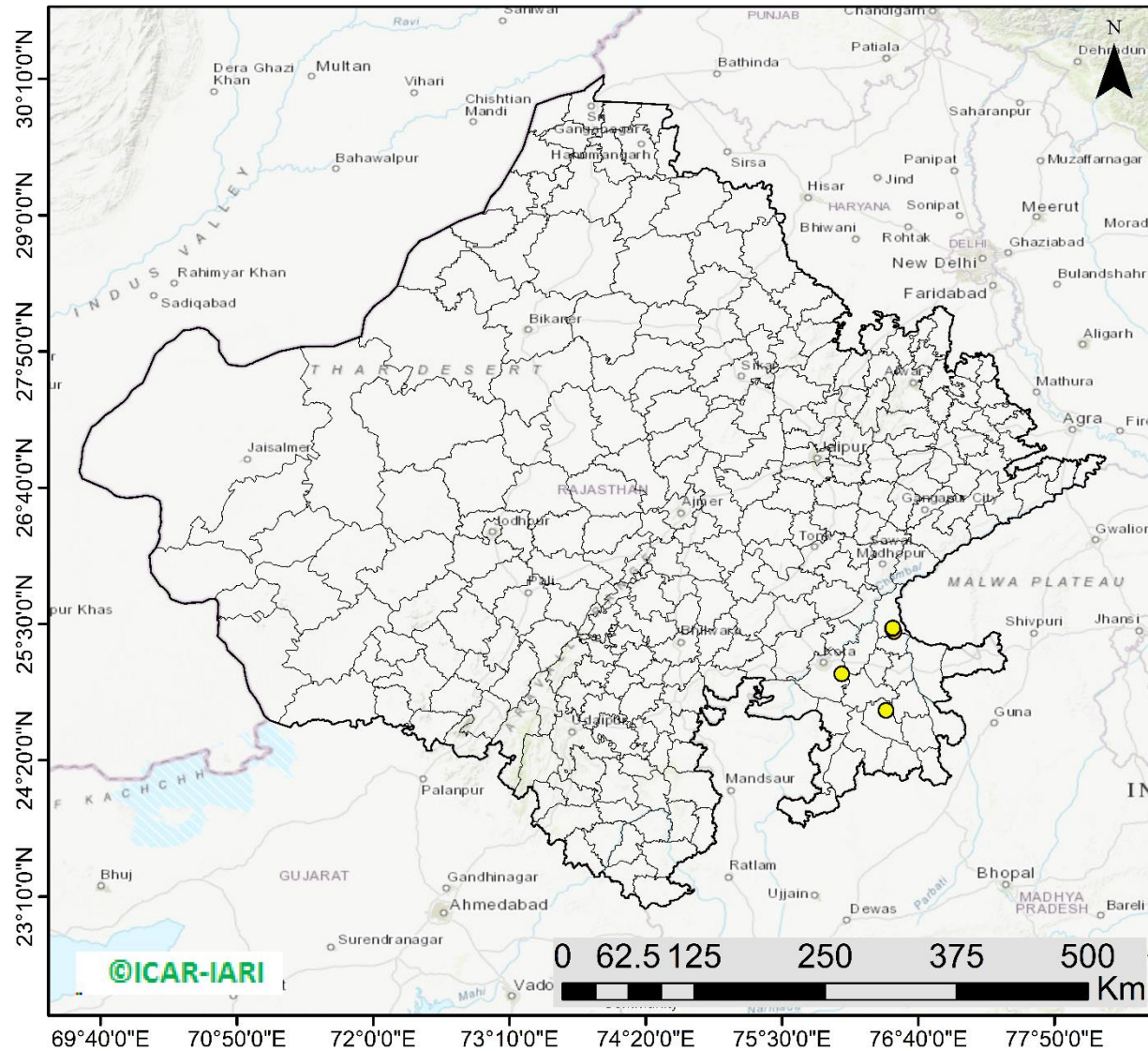
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Uttar Pradesh (15Sep-03Oct -2023)



Rajasthan

RICE RESIDUE BURNING IN RAJASTHAN



05 burning events
detected in Rajasthan on
(03rd Oct 2023)

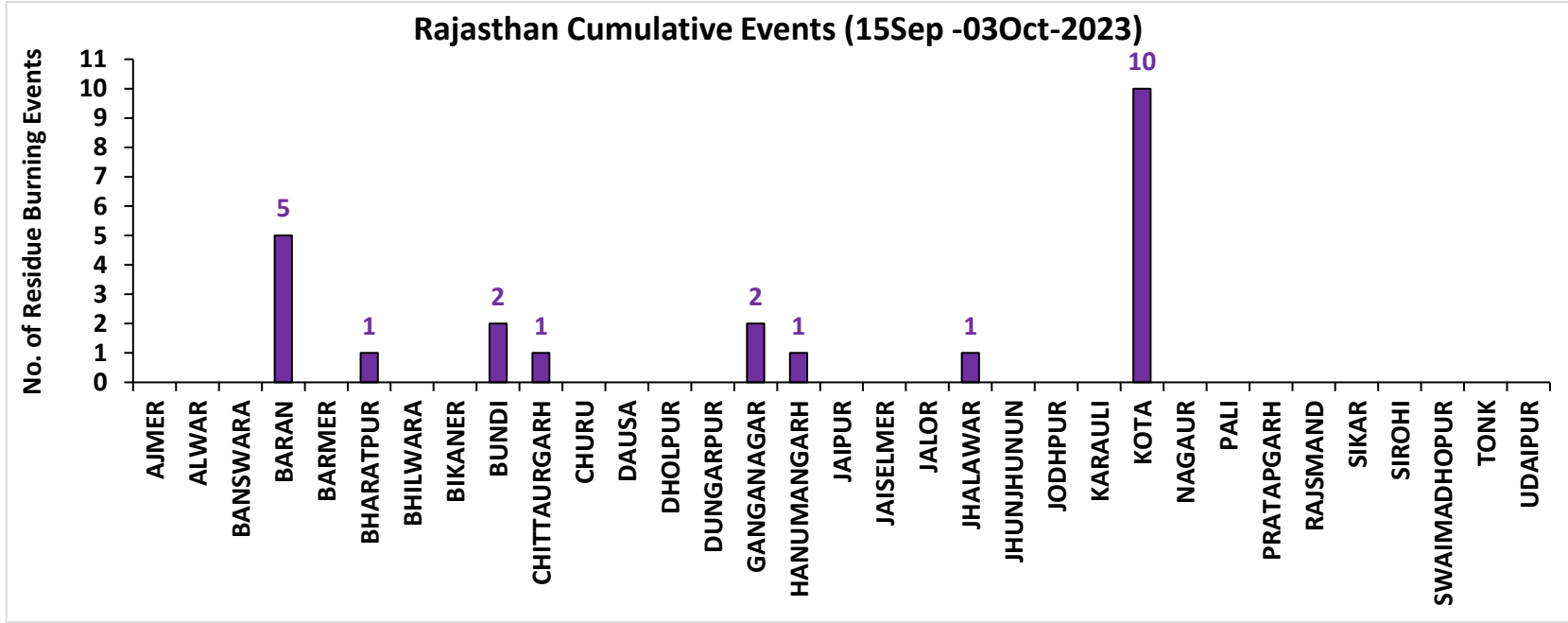
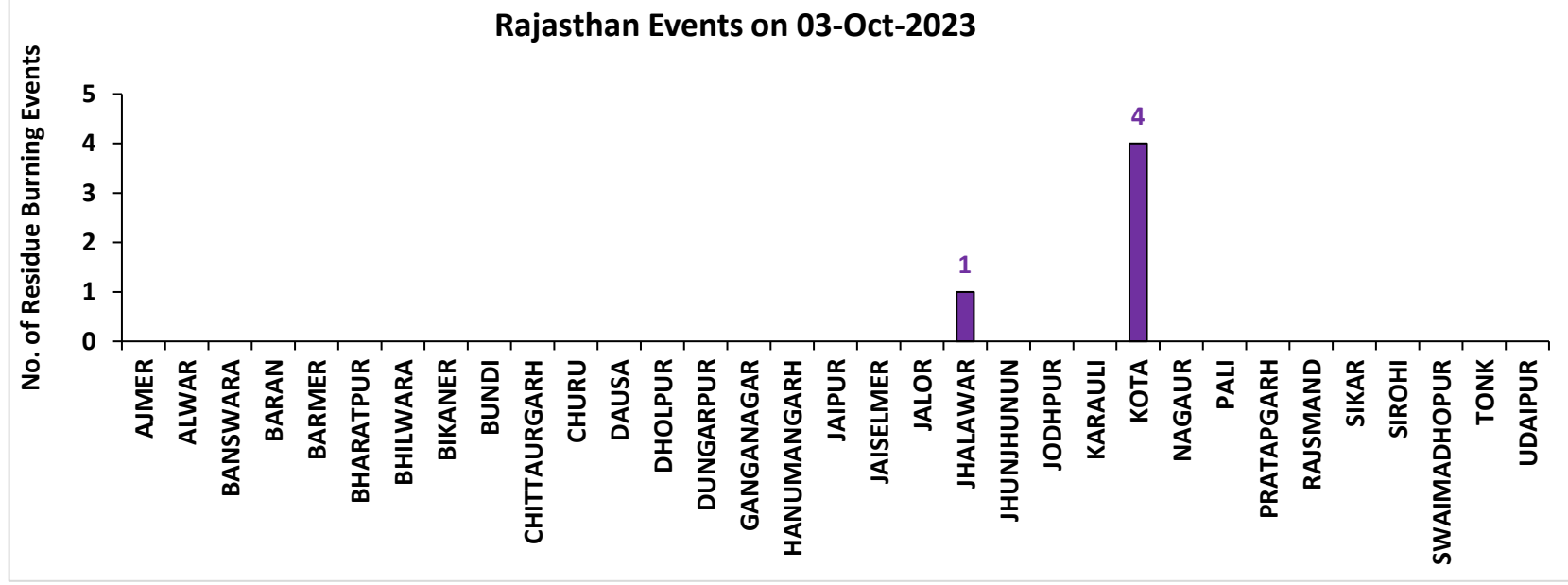
Fire Intensity (W/m²)

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



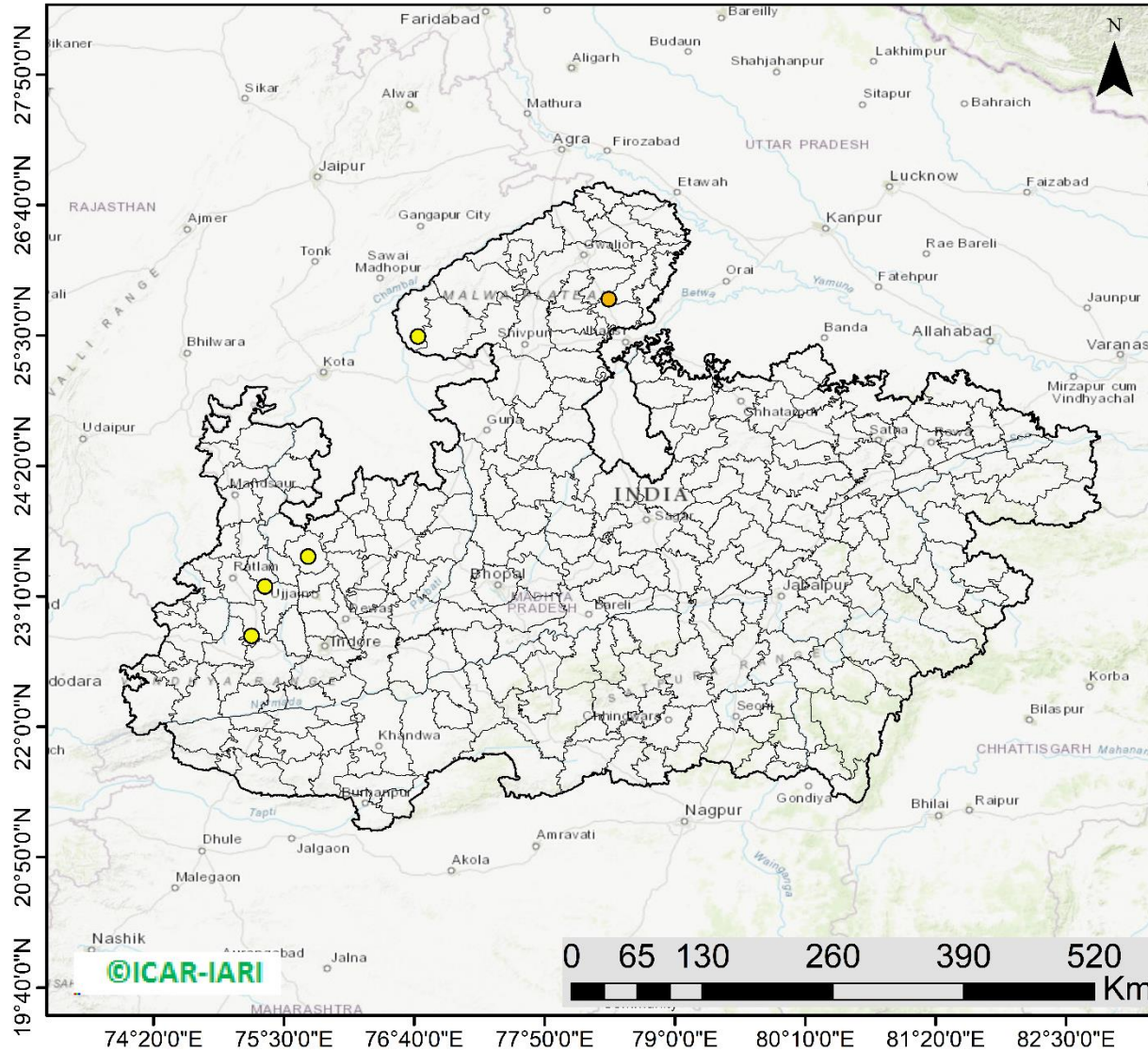
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Rajasthan (15Sep-03Oct -2023)



Madhya Pradesh

RICE RESIDUE BURNING IN MADHYA PRADESH



05 burning events detected in MP on (03rd Oct 2023)

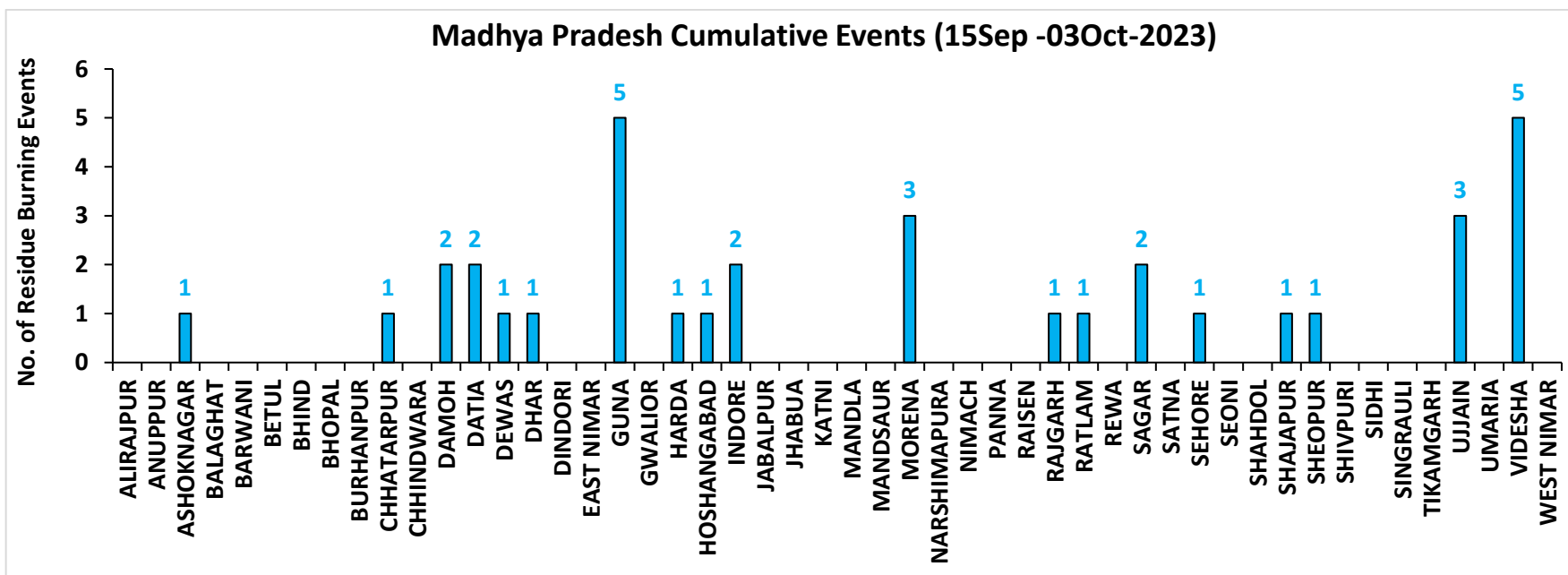
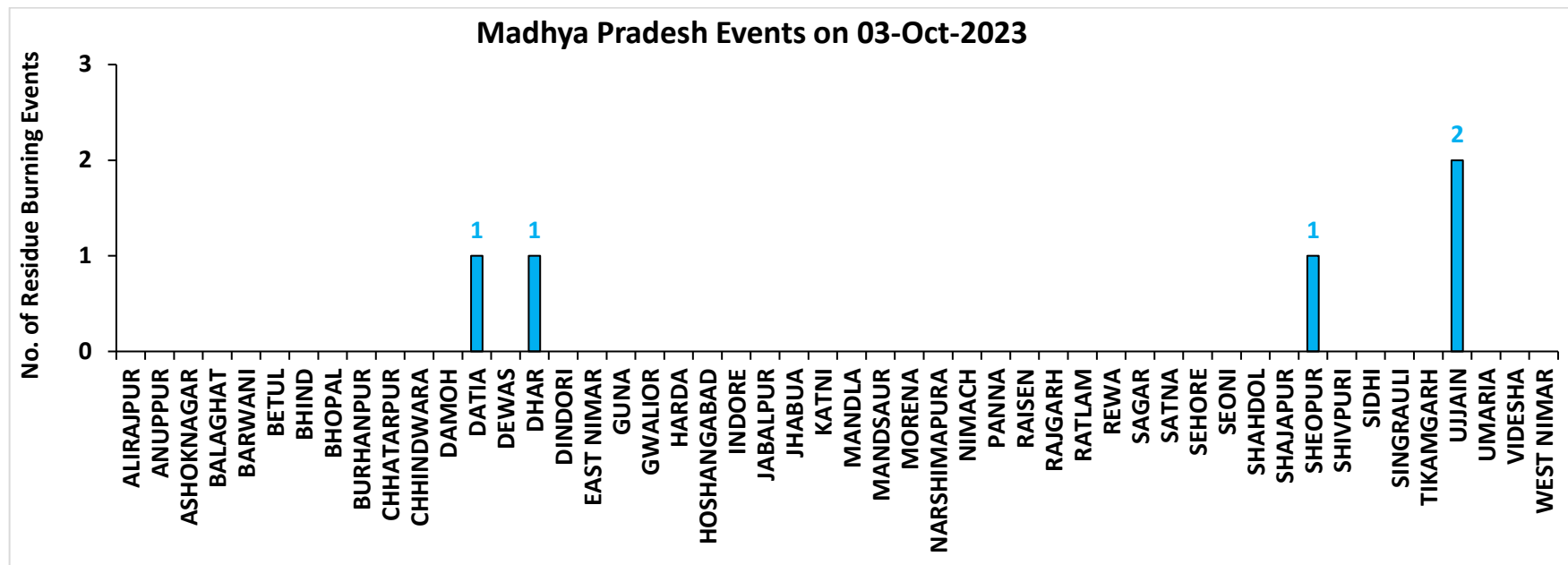
Fire Intensity (W/m²)

- 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 Madhya Pradesh (15Sep-03Oct -2023)



District-wise cumulative number of residues burning events detected in 2020, 2021, 2022 and 2023
(Period: 15 September-03 October)

(a) Punjab

| District | 15 Sep-03 Oct | | | |
|--------------------|---------------|------------|------------|------------|
| | 2020 | 2021 | 2022 | 2023 |
| Amritsar | 946 | 158 | 284 | 381 |
| Barnala | 2 | 0 | 0 | 4 |
| Bathinda | 0 | 0 | 0 | 0 |
| Faridkot | 3 | 9 | 0 | 2 |
| Fatehgarh Sahib | 14 | 0 | 1 | 4 |
| Fazilka | 0 | 1 | 0 | 1 |
| Firozpur | 16 | 3 | 5 | 6 |
| Gurdaspur | 48 | 4 | 5 | 6 |
| Hoshiarpur | 3 | 0 | 0 | 1 |
| Jalandhar | 12 | 2 | 3 | 8 |
| Kapurthala | 12 | 2 | 3 | 32 |
| Ludhiana | 32 | 11 | 1 | 4 |
| Mansa | 1 | 0 | 0 | 1 |
| Moga | 9 | 0 | 0 | 0 |
| Muktsar | 1 | 1 | 1 | 0 |
| Pathankot | 0 | 0 | 0 | 0 |
| Patiala | 49 | 11 | 6 | 23 |
| Rupnagar | 1 | 0 | 0 | 0 |
| Sangrur | 15 | 3 | 0 | 6 |
| SAS NAGAR (Mohali) | 7 | 0 | 1 | 12 |
| SBS Nagar | 2 | 1 | 1 | 1 |
| Tarn Taran | 268 | 31 | 39 | 69 |
| Total | 1441 | 237 | 350 | 561 |

(b) Haryana

| District | 15 Sep-03 Oct | | | |
|---------------|---------------|-----------|-----------|------------|
| | 2020 | 2021 | 2022 | 2023 |
| AMBALA | 17 | 0 | 3 | 24 |
| BHIWANI | 0 | 0 | 0 | 0 |
| CHARKHI DADRI | 0 | 0 | 0 | 0 |
| FARIDABAD | 0 | 0 | 0 | 0 |
| FATEHABAD | 13 | 1 | 1 | 6 |
| GURGAON | 0 | 0 | 0 | 0 |
| HISAR | 3 | 0 | 0 | 1 |
| JHAJJAR | 0 | 0 | 0 | 1 |
| JIND | 0 | 0 | 1 | 5 |
| KAITHAL | 17 | 2 | 1 | 5 |
| KARNAL | 36 | 4 | 6 | 14 |
| KURUKSHETRA | 28 | 11 | 4 | 32 |
| MAHENDRAGARH | 0 | 0 | 0 | 0 |
| MEWAT | 0 | 0 | 0 | 0 |
| PALWAL | 1 | 0 | 0 | 5 |
| PANCHKULA | 0 | 0 | 0 | 0 |
| PANIPAT | 6 | 0 | 0 | 4 |
| REWARI | 0 | 0 | 0 | 0 |
| ROHTAK | 0 | 0 | 0 | 1 |
| SIRSA | 1 | 0 | 0 | 0 |
| SONIPAT | 2 | 0 | 0 | 17 |
| YAMUNANAGAR | 7 | 1 | 1 | 22 |
| Total | 131 | 19 | 17 | 137 |

(c) Uttar Pradesh

| District | 15 Sep-03 Oct | | | | | | | | | | | | | |
|---------------|---------------|------|------|------|-----------------|---|---|---|---|------------------|-----------|-----------|-----------|-----------|
| | 2020 | 2021 | 2022 | 2023 | GAUTAMBUDHNAGAR | 1 | 0 | 0 | 2 | MUZAFARNAGAR | 0 | 0 | 0 | 0 |
| AGRA | 0 | 0 | 0 | 0 | GAZIPUR | 0 | 0 | 0 | 0 | PILHIBHIT | 2 | 1 | 2 | 5 |
| ALIGARH | 4 | 0 | 1 | 25 | GHAZIABAD | 1 | 0 | 1 | 4 | 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 | 2 | 3 | 0 | 0 |
| AMETHI | 0 | 0 | 0 | 0 | HAMIRPUR | 0 | 0 | 0 | 0 | SAMBHAL | 5 | 0 | 4 | 3 |
| AMROHA | 0 | 0 | 0 | 1 | HAPUR | 2 | 0 | 0 | 0 | SANTKABIRNAGAR | 0 | 0 | 0 | 0 |
| AURAIYA | 10 | 0 | 4 | 2 | HARDOI | 0 | 0 | 0 | 1 | SANTRAVIDASNAGAR | 0 | 0 | 0 | 0 |
| AZAMGARH | 0 | 0 | 0 | 0 | HATHRAS | 0 | 0 | 0 | 2 | SHAHJAHANPUR | 5 | 37 | 51 | 9 |
| BADAUN | 0 | 0 | 0 | 0 | JALAUN | 0 | 0 | 0 | 0 | SHAMLI | 7 | 2 | 2 | 1 |
| BAGHPAT | 1 | 0 | 0 | 0 | JAUNPUR | 0 | 0 | 0 | 0 | SHARANPUR | 3 | 0 | 0 | 0 |
| BAHRAICH | 0 | 0 | 0 | 0 | JHANSI | 2 | 0 | 0 | 0 | SHRAWASTI | 0 | 0 | 0 | 0 |
| BALLIA | 0 | 0 | 0 | 0 | KANNAUJ | 1 | 0 | 0 | 0 | SIDDHARTHANAGAR | 0 | 0 | 0 | 0 |
| BALRAMPUR | 0 | 0 | 0 | 0 | KANPUR | 0 | 1 | 0 | 0 | SITAPUR | 1 | 0 | 0 | 0 |
| BANDA | 0 | 0 | 0 | 0 | KANPUR DEHAT | 1 | 0 | 0 | 0 | SONBHADRA | 0 | 0 | 0 | 0 |
| BARABANKI | 1 | 0 | 0 | 0 | KASGANJ | 0 | 0 | 0 | 0 | SULTANPUR | 0 | 0 | 0 | 0 |
| BAREILLY | 0 | 0 | 0 | 0 | KAUSHAMBI | 1 | 0 | 0 | 1 | UNNAO | 2 | 0 | 0 | 0 |
| BASTI | 0 | 0 | 0 | 0 | KHERI | 1 | 3 | 8 | 0 | VARANASI | 0 | 0 | 0 | 0 |
| BIJNOR | 1 | 0 | 1 | 0 | KUSHINAGAR | 0 | 0 | 0 | 0 | Total | 67 | 49 | 78 | 65 |
| BULANDSAHAR | 1 | 0 | 2 | 1 | LALITPUR | 0 | 1 | 2 | 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 | 2 | 0 | 0 | 0 | MAINPURI | 0 | 0 | 0 | 0 | | | | | |
| ETAWAH | 0 | 0 | 0 | 0 | MATHURA | 2 | 1 | 0 | 6 | | | | | |
| FAIZABAD | 0 | 0 | 0 | 0 | MAU | 0 | 0 | 0 | 0 | | | | | |
| FARRUKHABAD | 0 | 0 | 0 | 0 | MEERUT | 6 | 0 | 0 | 0 | | | | | |
| FATEHPUR | 1 | 0 | 0 | 0 | MIRZAPUR | 0 | 0 | 0 | 0 | | | | | |
| FIROZABAD | 0 | 0 | 0 | 0 | MORADABAD | 0 | 0 | 0 | 0 | | | | | |

(d) Delhi

| District | 15 Sep-03 Oct | | | |
|------------------|---------------|----------|----------|----------|
| | 2020 | 2021 | 2022 | 2023 |
| CENTRAL | 0 | 0 | 0 | 0 |
| EAST | 0 | 0 | 0 | 0 |
| NEW DELHI | 0 | 0 | 0 | 0 |
| NORTH | 1 | 0 | 0 | 1 |
| NORTH EAST | 0 | 0 | 0 | 0 |
| NORTH WEST DELHI | 0 | 0 | 0 | 0 |
| SHAHADRA | 0 | 0 | 0 | 0 |
| SOUTH | 1 | 0 | 0 | 0 |
| SOUTH EAST | 0 | 0 | 0 | 0 |
| SOUTH WEST DELHI | 0 | 0 | 0 | 0 |
| WEST DELHI | 0 | 0 | 0 | 0 |
| Total | 2 | 0 | 0 | 1 |

(e) Rajasthan

| District | 15 Sep-03 Oct | | | |
|--------------|---------------|----------|----------|-----------|
| | 2020 | 2021 | 2022 | 2023 |
| AJMER | 0 | 0 | 0 | 0 |
| ALWAR | 1 | 0 | 0 | 0 |
| BANSWARA | 0 | 0 | 0 | 0 |
| BARAN | 11 | 0 | 3 | 5 |
| BARMER | 2 | 0 | 0 | 0 |
| BHARATPUR | 0 | 0 | 0 | 1 |
| BHILWARA | 1 | 0 | 0 | 0 |
| BIKANER | 0 | 0 | 0 | 0 |
| BUNDI | 1 | 0 | 2 | 2 |
| CHITTAURGARH | 0 | 1 | 0 | 1 |
| CHURU | 0 | 0 | 0 | 0 |
| DAUSA | 0 | 0 | 0 | 0 |
| DHOLPUR | 0 | 0 | 0 | 0 |
| DUNGARPUR | 0 | 0 | 0 | 0 |
| GANGANAGAR | 1 | 0 | 0 | 2 |
| HANUMANGARH | 6 | 0 | 1 | 1 |
| JAIPUR | 0 | 0 | 0 | 0 |
| JAISELMER | 1 | 0 | 0 | 0 |
| JALOR | 0 | 0 | 0 | 0 |
| JHALAWAR | 0 | 0 | 0 | 1 |
| JHUNJHUNUN | 0 | 0 | 0 | 0 |
| JODHPUR | 1 | 0 | 0 | 0 |
| KARAULI | 1 | 0 | 0 | 0 |
| KOTA | 1 | 0 | 1 | 10 |
| NAGAU | 0 | 0 | 0 | 0 |
| PALI | 1 | 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 | 1 | 0 | 0 | 0 |
| UDAIPUR | 0 | 0 | 0 | 0 |
| Total | 29 | 1 | 7 | 23 |

(f) Madhya Pradesh

| District | 15 Sep-03 Oct | | | | | | | | |
|--------------|---------------|------|------|------|--------------|-----------|----------|----------|-----------|
| | 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 | 1 | 0 | 2 | 1 |
| ASHOKNAGAR | 5 | 0 | 0 | 1 | RATLAM | 0 | 0 | 0 | 1 |
| BALAGHAT | 0 | 0 | 0 | 0 | REWA | 0 | 0 | 0 | 0 |
| BARWANI | 0 | 0 | 0 | 0 | SAGAR | 2 | 2 | 1 | 2 |
| BETUL | 0 | 0 | 0 | 0 | SATNA | 1 | 0 | 0 | 0 |
| BHIND | 0 | 0 | 0 | 0 | SEHORE | 1 | 0 | 1 | 1 |
| BHOPAL | 1 | 0 | 0 | 0 | SEONI | 0 | 0 | 0 | 0 |
| BURHANPUR | 0 | 0 | 0 | 0 | SHAHDOL | 0 | 0 | 0 | 0 |
| CHHATARPUR | 1 | 0 | 0 | 1 | SHAJAPUR | 2 | 0 | 0 | 1 |
| CHHINDWARA | 0 | 0 | 0 | 0 | SHEOPUR | 0 | 0 | 0 | 1 |
| DAMOH | 5 | 0 | 0 | 2 | SHIVPURI | 0 | 0 | 0 | 0 |
| DATIA | 1 | 0 | 0 | 2 | SIDHI | 0 | 0 | 0 | 0 |
| DEWAS | 0 | 0 | 0 | 1 | SINGRAULI | 0 | 0 | 0 | 0 |
| DHAR | 3 | 0 | 0 | 1 | TIKAMGARH | 0 | 0 | 0 | 0 |
| DINDORI | 0 | 0 | 0 | 0 | UJJAIN | 3 | 0 | 0 | 3 |
| EAST NIMAR | 0 | 0 | 0 | 0 | UMARIA | 0 | 0 | 0 | 0 |
| GUNA | 5 | 1 | 1 | 5 | VIDESHA | 5 | 1 | 1 | 5 |
| GWALIOR | 3 | 0 | 1 | 0 | WEST NIMAR | 0 | 0 | 0 | 0 |
| HARDA | 2 | 2 | 0 | 1 | Total | 43 | 6 | 7 | 35 |
| HOSHANGABAD | 0 | 0 | 0 | 1 | | | | | |
| INDORE | 1 | 0 | 0 | 2 | | | | | |
| JABALPUR | 1 | 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 | 3 | | | | | |
| 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-03 October)

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 |
| 25-Sep | 184 | 11 | 0 | 0 | 11 | 0 | 0 | 1 | 5 | 0 | 0 | 1 |
| 26-Sep | 190 | 19 | 0 | 3 | 5 | 0 | 0 | 2 | 8 | 0 | 0 | 0 |
| 27-Sep | 78 | 37 | 0 | 21 | 8 | 0 | 0 | 9 | 4 | 1 | 0 | 0 |
| 28-Sep | 55 | 28 | 0 | 33 | 6 | 1 | 0 | 8 | 1 | 6 | 0 | 4 |
| 29-Sep | 63 | 64 | 0 | 68 | 9 | 4 | 0 | 17 | 6 | 10 | 0 | 6 |
| 30-Sep | 116 | 27 | 8 | 81 | 22 | 2 | 0 | 26 | 13 | 13 | 10 | 18 |
| 01-Oct | 165 | 13 | 45 | 123 | 15 | 4 | 1 | 21 | 7 | 13 | 3 | 17 |
| 02-Oct | 141 | 0 | 83 | 119 | 30 | 2 | 7 | 24 | 12 | 0 | 36 | 7 |
| 03-Oct | 110 | 9 | 75 | 105 | 8 | 6 | 8 | 17 | 4 | 3 | 29 | 8 |
| Total | 1441 | 237 | 350 | 561 | 131 | 19 | 17 | 137 | 67 | 49 | 78 | 65 |

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 |
| 25-Sep | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 26-Sep | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 27-Sep | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 28-Sep | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 |
| 29-Sep | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 6 | 0 | 4 | 0 | 5 |
| 30-Sep | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 5 | 0 | 0 | 11 |
| 01-Oct | 0 | 0 | 0 | 0 | 4 | 1 | 1 | 4 | 13 | 0 | 1 | 8 |
| 02-Oct | 1 | 0 | 0 | 0 | 7 | 0 | 3 | 4 | 12 | 0 | 1 | 1 |
| 03-Oct | 0 | 0 | 0 | 0 | 9 | 0 | 2 | 5 | 5 | 1 | 5 | 5 |
| Total | 2 | 0 | 0 | 1 | 29 | 1 | 7 | 23 | 43 | 6 | 7 | 35 |

Details of residue burning events in Punjab on 03-Oct-2023

| S. No. | District | Tehsil / Block | Satellite | Latitude | Longitude | ACQ_TIME | Day / Night | Fire Power (W/m2) |
|--------|----------|----------------|-----------|----------|-----------|----------|-------------|-------------------|
| 1 | AMRITSAR | AJNALA | S-NPP | 31.83850 | 74.86579 | 14:00:48 | D | 3.90 |
| 2 | AMRITSAR | ATTARI | S-NPP | 31.57680 | 74.73640 | 14:00:48 | D | 2.50 |
| 3 | AMRITSAR | ATTARI | S-NPP | 31.59105 | 74.83806 | 14:00:48 | D | 3.80 |
| 4 | AMRITSAR | CHOGAWAN | S-NPP | 31.80026 | 74.61153 | 14:00:48 | D | 2.20 |
| 5 | AMRITSAR | CHOGAWAN | S-NPP | 31.84184 | 74.63889 | 14:00:48 | D | 6.30 |
| 6 | AMRITSAR | HARSHA CHHINA | S-NPP | 31.79926 | 74.69358 | 14:00:48 | D | 15.50 |
| 7 | AMRITSAR | HARSHA CHHINA | S-NPP | 31.80272 | 74.68286 | 14:00:48 | D | 5.80 |
| 8 | AMRITSAR | HARSHA CHHINA | S-NPP | 31.80765 | 74.68738 | 14:00:48 | D | 5.20 |
| 9 | AMRITSAR | HARSHA CHHINA | S-NPP | 31.81110 | 74.67665 | 14:00:48 | D | 7.50 |
| 10 | AMRITSAR | HARSHA CHHINA | S-NPP | 31.83576 | 74.86847 | 14:00:48 | D | 5.30 |
| 11 | AMRITSAR | JANDIALA GURU | S-NPP | 31.53430 | 75.02660 | 14:00:48 | D | 2.90 |
| 12 | AMRITSAR | JANDIALA GURU | S-NPP | 31.53554 | 75.02412 | 14:00:48 | D | 1.80 |
| 13 | AMRITSAR | JANDIALA GURU | S-NPP | 31.54640 | 75.05721 | 14:00:48 | D | 8.00 |
| 14 | AMRITSAR | JANDIALA GURU | S-NPP | 31.54744 | 75.05473 | 14:00:48 | D | 7.20 |
| 15 | AMRITSAR | JANDIALA GURU | S-NPP | 31.61238 | 75.01463 | 14:00:48 | D | 3.20 |
| 16 | AMRITSAR | JANDIALA GURU | S-NPP | 31.62794 | 75.03408 | 14:00:48 | D | 4.20 |
| 17 | AMRITSAR | JANDIALA GURU | AQUA | 31.57600 | 75.06300 | 13:41:45 | D | 13.30 |
| 18 | AMRITSAR | JANDIALA GURU | AQUA | 31.60200 | 75.02600 | 13:41:45 | D | 9.50 |
| 19 | AMRITSAR | JANDIALA GURU | AQUA | 31.60400 | 75.04100 | 13:41:45 | D | 11.80 |
| 20 | AMRITSAR | MAJITHA | S-NPP | 31.71564 | 75.03101 | 14:00:48 | D | 8.30 |
| 21 | AMRITSAR | MAJITHA | S-NPP | 31.71618 | 74.98814 | 14:00:48 | D | 4.60 |
| 22 | AMRITSAR | MAJITHA | S-NPP | 31.72070 | 74.98756 | 14:00:48 | D | 9.80 |
| 23 | AMRITSAR | MAJITHA | S-NPP | 31.73723 | 74.92176 | 14:00:48 | D | 3.10 |
| 24 | AMRITSAR | MAJITHA | S-NPP | 31.73823 | 74.96306 | 14:00:48 | D | 3.00 |
| 25 | AMRITSAR | MAJITHA | S-NPP | 31.73897 | 74.92046 | 14:00:48 | D | 5.30 |
| 26 | AMRITSAR | MAJITHA | S-NPP | 31.74127 | 74.96374 | 14:00:48 | D | 3.20 |
| 27 | AMRITSAR | MAJITHA | AQUA | 31.70600 | 75.02400 | 13:41:45 | D | 10.40 |
| 28 | AMRITSAR | MAJITHA | AQUA | 31.78500 | 74.95100 | 13:41:45 | D | 14.40 |
| 29 | AMRITSAR | MAJITHA | AQUA | 31.78800 | 74.96600 | 13:41:45 | D | 8.10 |
| 30 | AMRITSAR | RAYYA | S-NPP | 31.51051 | 75.21291 | 14:00:48 | D | 14.20 |

| | | | | | | | | |
|----|------------|------------------|-------|----------|----------|----------|---|-------|
| 31 | AMRITSAR | RAYYA | S-NPP | 31.54066 | 75.18521 | 14:00:48 | D | 3.40 |
| 32 | AMRITSAR | RAYYA | S-NPP | 31.54148 | 75.19826 | 14:00:48 | D | 9.70 |
| 33 | AMRITSAR | RAYYA | S-NPP | 31.54161 | 75.19601 | 14:00:48 | D | 4.80 |
| 34 | AMRITSAR | RAYYA | S-NPP | 31.58378 | 75.30637 | 14:00:48 | D | 3.80 |
| 35 | AMRITSAR | TARSIKKA | S-NPP | 31.59052 | 75.12479 | 14:00:48 | D | 4.00 |
| 36 | AMRITSAR | TARSIKKA | S-NPP | 31.60169 | 75.09639 | 14:00:48 | D | 6.60 |
| 37 | AMRITSAR | TARSIKKA | S-NPP | 31.60555 | 75.18821 | 14:00:48 | D | 4.30 |
| 38 | AMRITSAR | TARSIKKA | S-NPP | 31.60623 | 75.09584 | 14:00:48 | D | 5.60 |
| 39 | AMRITSAR | TARSIKKA | S-NPP | 31.63905 | 75.15142 | 14:00:48 | D | 4.30 |
| 40 | AMRITSAR | TARSIKKA | S-NPP | 31.63955 | 75.10798 | 14:00:48 | D | 5.80 |
| 41 | AMRITSAR | TARSIKKA | S-NPP | 31.64590 | 75.17494 | 14:00:48 | D | 1.80 |
| 42 | AMRITSAR | TARSIKKA | S-NPP | 31.64615 | 75.17781 | 14:00:48 | D | 2.80 |
| 43 | AMRITSAR | TARSIKKA | S-NPP | 31.65914 | 75.06483 | 14:00:48 | D | 3.50 |
| 44 | AMRITSAR | TARSIKKA | AQUA | 31.59200 | 75.15100 | 13:41:45 | D | 9.80 |
| 45 | AMRITSAR | TARSIKKA | AQUA | 31.67300 | 75.14000 | 13:41:45 | D | 8.20 |
| 46 | AMRITSAR | VERKA | S-NPP | 31.71221 | 74.94605 | 14:00:48 | D | 4.40 |
| 47 | AMRITSAR | VERKA | AQUA | 31.67800 | 74.81100 | 13:41:45 | D | 10.70 |
| 48 | AMRITSAR | VERKA | AQUA | 31.70300 | 74.94700 | 13:41:45 | D | 13.50 |
| 49 | BARNALA | BARNALA | S-NPP | 30.22903 | 75.59198 | 14:00:48 | D | 5.10 |
| 50 | BARNALA | BARNALA | S-NPP | 30.26827 | 75.71455 | 14:00:48 | D | 7.00 |
| 51 | BARNALA | BARNALA | S-NPP | 30.26878 | 75.72006 | 14:00:48 | D | 11.10 |
| 52 | FAZILKA | FAZILKA | S-NPP | 30.46238 | 74.03877 | 14:00:48 | D | 3.00 |
| 53 | FIROZPUR | MAMDOT | S-NPP | 30.80551 | 74.47272 | 14:00:48 | D | 3.30 |
| 54 | GURDASPUR | SRI HARGOBINDPUR | S-NPP | 31.69629 | 75.27338 | 14:00:48 | D | 4.50 |
| 55 | JALANDHAR | JALANDHAR WEST | S-NPP | 31.42457 | 75.48134 | 14:00:48 | D | 5.90 |
| 56 | JALANDHAR | JALANDHAR WEST | S-NPP | 31.48252 | 75.57993 | 14:00:48 | D | 3.80 |
| 57 | KAPURTHALA | KAPURTHALA | S-NPP | 31.35513 | 75.27850 | 14:00:48 | D | 3.50 |
| 58 | KAPURTHALA | KAPURTHALA | S-NPP | 31.35533 | 75.27953 | 14:00:48 | D | 5.20 |
| 59 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.21058 | 75.16479 | 14:00:48 | D | 4.70 |
| 60 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.23919 | 75.12064 | 14:00:48 | D | 3.30 |
| 61 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.24111 | 75.14181 | 14:00:48 | D | 6.80 |
| 62 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.24921 | 75.13010 | 14:00:48 | D | 3.50 |
| 63 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.25163 | 75.15659 | 14:00:48 | D | 6.30 |

| | | | | | | | | |
|----|------------|-----------------|-------|----------|----------|----------|---|-------|
| 64 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.25423 | 75.13483 | 14:00:48 | D | 4.30 |
| 65 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.26930 | 75.14905 | 14:00:48 | D | 6.90 |
| 66 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.27937 | 75.15856 | 14:00:48 | D | 7.00 |
| 67 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.27986 | 75.16388 | 14:00:48 | D | 7.00 |
| 68 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.28588 | 75.17929 | 14:00:48 | D | 4.10 |
| 69 | KAPURTHALA | SULTANPUR LODHI | S-NPP | 31.32480 | 75.20158 | 14:00:48 | D | 3.60 |
| 70 | PATIALA | PATIALA | S-NPP | 30.26583 | 76.32272 | 14:00:48 | D | 11.70 |
| 71 | PATIALA | PATIALA | S-NPP | 30.27343 | 76.25875 | 14:00:48 | D | 5.90 |
| 72 | PATIALA | PATIALA | S-NPP | 30.27481 | 76.26133 | 14:00:48 | D | 14.10 |
| 73 | PATIALA | PATIALA | S-NPP | 30.27569 | 76.22845 | 14:00:48 | D | 5.30 |
| 74 | PATIALA | PATIALA | S-NPP | 30.27823 | 76.25822 | 14:00:48 | D | 5.90 |
| 75 | PATIALA | SANAUR | S-NPP | 30.26454 | 76.32630 | 14:00:48 | D | 7.50 |
| 76 | PATIALA | SHAMBU KALAN | S-NPP | 30.46932 | 76.68288 | 14:00:48 | D | 8.40 |
| 77 | SANGRUR | BHAWANIGARH | S-NPP | 30.26186 | 76.17310 | 14:00:48 | D | 3.50 |
| 78 | SANGRUR | BHAWANIGARH | S-NPP | 30.26585 | 76.16985 | 14:00:48 | D | 9.20 |
| 79 | SANGRUR | BHAWANIGARH | S-NPP | 30.26664 | 76.17256 | 14:00:48 | D | 6.50 |
| 80 | TARN TARAN | BHIKHIWIND | S-NPP | 31.32130 | 74.61746 | 14:00:48 | D | 28.30 |
| 81 | TARN TARAN | CHOHLA SAHIB | S-NPP | 31.30662 | 75.01134 | 14:00:48 | D | 3.80 |
| 82 | TARN TARAN | CHOHLA SAHIB | S-NPP | 31.35498 | 75.07301 | 14:00:48 | D | 8.00 |
| 83 | TARN TARAN | GANDIWIND TATLA | S-NPP | 31.49899 | 74.62411 | 14:00:48 | D | 6.60 |
| 84 | TARN TARAN | GANDIWIND TATLA | S-NPP | 31.49913 | 74.62167 | 14:00:48 | D | 4.00 |
| 85 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.38655 | 75.11726 | 14:00:48 | D | 6.20 |
| 86 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.39917 | 75.10500 | 14:00:48 | D | 4.90 |
| 87 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.41529 | 75.08160 | 14:00:48 | D | 11.40 |
| 88 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.43437 | 75.13538 | 14:00:48 | D | 6.50 |
| 89 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.43446 | 75.13830 | 14:00:48 | D | 6.50 |
| 90 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.45015 | 75.10654 | 14:00:48 | D | 9.70 |
| 91 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.46733 | 75.09368 | 14:00:48 | D | 2.00 |
| 92 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.48498 | 75.08616 | 14:00:48 | D | 4.10 |
| 93 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.48755 | 75.06442 | 14:00:48 | D | 2.60 |
| 94 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.51118 | 75.07223 | 14:00:48 | D | 2.00 |
| 95 | TARN TARAN | KHADUR SAHIB | S-NPP | 31.51621 | 75.07697 | 14:00:48 | D | 3.10 |
| 96 | TARN TARAN | KHADUR SAHIB | AQUA | 31.37200 | 75.11700 | 13:41:45 | D | 16.00 |

| | | | | | | | | |
|-----|------------|--------------|-------|----------|----------|----------|---|-------|
| 97 | TARN TARAN | KHADUR SAHIB | AQUA | 31.41300 | 75.07000 | 13:41:45 | D | 12.60 |
| 98 | TARN TARAN | KHADUR SAHIB | AQUA | 31.45400 | 75.06000 | 13:41:45 | D | 8.30 |
| 99 | TARN TARAN | KHADUR SAHIB | AQUA | 31.48800 | 75.09100 | 13:41:45 | D | 12.40 |
| 100 | TARN TARAN | KHADUR SAHIB | AQUA | 31.50200 | 75.16400 | 13:41:45 | D | 19.80 |
| 101 | TARN TARAN | KHADUR SAHIB | AQUA | 31.50500 | 75.17900 | 13:41:45 | D | 7.40 |
| 102 | TARN TARAN | KHADUR SAHIB | AQUA | 31.51700 | 75.06800 | 13:41:45 | D | 9.00 |
| 103 | TARN TARAN | TARN TARAN | S-NPP | 31.42966 | 74.88158 | 14:00:48 | D | 16.50 |
| 104 | TARN TARAN | TARN TARAN | S-NPP | 31.48237 | 74.86456 | 14:00:48 | D | 2.40 |
| 105 | TARN TARAN | TARN TARAN | S-NPP | 31.50818 | 75.04045 | 14:00:48 | D | 4.20 |

Details of residue burning events in Haryana on 03-Oct-2023

| S. No. | District | Tehsil / Block | Satellite | Latitude | Longitude | ACQ_TIME | Day / Night | Fire Power (W/m2) |
|--------|-------------|----------------|-----------|----------|-----------|----------|-------------|-------------------|
| 1 | AMBALA | AMBALA-II | S-NPP | 30.25471 | 76.81977 | 14:00:48 | D | 4.20 |
| 2 | AMBALA | AMBALA-II | S-NPP | 30.28174 | 76.84291 | 14:00:48 | D | 8.80 |
| 3 | AMBALA | NARAINGARH | S-NPP | 30.44606 | 77.14429 | 14:00:48 | D | 5.30 |
| 4 | AMBALA | SAHA | S-NPP | 30.27224 | 76.90945 | 14:00:48 | D | 3.90 |
| 5 | AMBALA | SHAHZADPUR | S-NPP | 30.48989 | 76.92888 | 14:00:48 | D | 7.70 |
| 6 | HISAR | BARWALA | S-NPP | 29.44063 | 75.94199 | 14:00:48 | D | 6.80 |
| 7 | KURUKSHETRA | SHAHBAD | AQUA | 30.13000 | 76.85700 | 13:41:45 | D | 7.70 |
| 8 | KURUKSHETRA | THANESAR | S-NPP | 29.91126 | 76.74465 | 14:00:48 | D | 6.20 |
| 9 | KURUKSHETRA | THANESAR | S-NPP | 30.01182 | 76.86866 | 14:00:48 | D | 14.40 |
| 10 | KURUKSHETRA | THANESAR | S-NPP | 30.01260 | 76.86872 | 14:00:48 | D | 22.10 |
| 11 | PALWAL | HODAL | S-NPP | 27.93367 | 77.42338 | 14:00:48 | D | 9.50 |
| 12 | SONIPAT | SONIPAT | AQUA | 29.10900 | 76.85900 | 13:41:45 | D | 18.80 |
| 13 | YAMUNANAGAR | BILASPUR | S-NPP | 30.41047 | 77.31491 | 14:00:48 | D | 4.10 |
| 14 | YAMUNANAGAR | BILASPUR | AQUA | 30.31000 | 77.20000 | 13:41:45 | D | 8.60 |
| 15 | YAMUNANAGAR | RADAUR | AQUA | 30.03900 | 77.11800 | 13:41:45 | D | 17.50 |
| 16 | YAMUNANAGAR | RADAUR | AQUA | 30.04800 | 77.11500 | 13:41:45 | D | 8.70 |
| 17 | YAMUNANAGAR | SADHAURA | S-NPP | 30.31626 | 77.19534 | 14:00:48 | D | 5.70 |

Details of residue burning events in Uttar Pradesh on 03-Oct-2023

| S. No. | District | Tehsil / Block | Satellite | Latitude | Longitude | ACQ_TIME | Day / Night | Fire Power (W/m ²) |
|--------|--------------|----------------|-----------|----------|-----------|----------|-------------|--------------------------------|
| 1 | ALIGARH | KHAIR | S-NPP | 27.97280 | 77.64635 | 14:00:48 | D | 2.50 |
| 2 | ALIGARH | KHAIR | S-NPP | 27.99888 | 77.77295 | 14:00:48 | D | 3.40 |
| 3 | ALIGARH | KHAIR | AQUA | 28.00000 | 77.68300 | 13:41:45 | D | 9.50 |
| 4 | GHAZIABAD | MODINAGAR | AQUA | 28.77700 | 77.56900 | 13:41:45 | D | 7.90 |
| 5 | MATHURA | CHHATA | S-NPP | 27.84757 | 77.47956 | 14:00:48 | D | 3.10 |
| 6 | MATHURA | CHHATA | S-NPP | 27.84866 | 77.48150 | 14:00:48 | D | 5.50 |
| 7 | MATHURA | CHHATA | S-NPP | 27.87921 | 77.50529 | 12:21:14 | D | 4.10 |
| 8 | SHAHJAHANPUR | TILHAR | AQUA | 27.95400 | 79.78900 | 13:41:45 | D | 5.20 |

Details of residue burning events in Rajasthan on 03-Oct-2023

| S. No. | District | Tehsil / Block | Satellite | Latitude | Longitude | ACQ_TIME | Day / Night | Fire Power (W/m ²) |
|--------|----------|----------------|-----------|----------|-----------|----------|-------------|--------------------------------|
| 1 | JHALAWAR | KHANPUR | S-NPP | 24.75953 | 76.39140 | 14:00:48 | D | 2.00 |
| 2 | KOTA | LADPURA | S-NPP | 25.07287 | 76.01180 | 14:00:48 | D | 3.50 |
| 3 | KOTA | PIPALDA | S-NPP | 25.43369 | 76.45927 | 14:00:48 | D | 7.90 |
| 4 | KOTA | PIPALDA | S-NPP | 25.46013 | 76.44571 | 14:00:48 | D | 6.70 |
| 5 | KOTA | PIPALDA | S-NPP | 25.46524 | 76.45032 | 14:00:48 | D | 4.50 |

Details of residue burning events in Madhya Pradesh on 03-Oct-2023

| S. No. | District | Tehsil / Block | Satellite | Latitude | Longitude | ACQ_TIME | Day / Night | Fire Power (W/m ²) |
|--------|----------|----------------|-----------|----------|-----------|----------|-------------|--------------------------------|
| 1 | DATIA | SEONDHA | S-NPP | 25.82378 | 78.40822 | 14:00:48 | D | 5.40 |
| 2 | DHAR | BADNAWAR | S-NPP | 22.81182 | 75.21135 | 14:00:48 | D | 2.50 |
| 3 | SHEOPUR | KARAHAL | S-NPP | 25.49087 | 76.70108 | 14:00:48 | D | 4.20 |
| 4 | UJJAIN | BARNAGAR | S-NPP | 23.25410 | 75.33070 | 14:00:48 | D | 4.10 |
| 5 | UJJAIN | MEHIDPUR | S-NPP | 23.52124 | 75.71716 | 14:00:48 | D | 3.20 |

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)
