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What this file is. A sample synopsis for the IGNOU MSCGI Project, course MGYP-031 (Dissertation/Project Work, M.Sc. Geoinformatics). It shows how the parts asked for in section 1.7 of the MGYP-031 Handbook on Dissertation/Project Work (School of Sciences, IGNOU, November 2024) fit together on one study.

What it is not. It is not a synopsis you can post. It is study reference only. Every place, date, count, threshold and result that belongs to your own study is left in [square brackets]. Your synopsis must be written by you under your supervisor's guidance (Handbook 1.7: a synopsis with copied or plagiarised material is summarily rejected).

How it was prepared. By the ignouproject.com editorial desk in November 2026, drafted with AI assistance from the MGYP-031 Handbook (read in November 2026), checked against the sources listed at the end, and published under BK Sahni's editorial responsibility. It is an independent study aid; ignouproject.com is not affiliated with IGNOU.

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What your own synopsis still needs (Handbook 1.7 and 1.8)

- Typed on A4, Times New Roman 12 point, 1.5 line spacing, 15 to 20 pages or about 4,000 words, spiral bound.
- An Introduction of about four pages with at least 25 latest references, and a Literature Review of about six pages with at least 25 to 30 latest references, written as flowing prose (Appendix III, point 7). This sample cites a short, verified list only, to show the form.
- A Research Methodology of about five pages; the Handbook calls it desirable to give the online data links and the dates you accessed them.
- Objectives, which the Handbook says can be given in three to four bullet points, and references in APA style in alphabetical order.
- The packet order: Appendix I proforma, Appendix II, Appendix III, Appendix IV consent letter, Appendix V supervisor bio-data with self-attested papers, your synopsis, Appendix VI acknowledgement; one hard copy signed by the supervisor, with a cover letter, by registered or speed post to the Programme Coordinator, MSCGI Programme, Discipline of Geology, School of Sciences, Block 15J, IGNOU, Maidan Garhi, New Delhi 110068.

Why this topic was chosen for the sample: it sits on three sub-themes printed in Table 1.1 of the Handbook (burn delineation, compliance monitoring of farming practices, air quality studies), it uses only free data, and it needs both satellite data and ground truth, as section 1.7 (vi) asks. Choose your own topic with your supervisor.

Synopsis of Dissertation/Project Work

MGYP-031

Mapping Post-Monsoon Paddy Residue Burning with Sentinel-2 Burn Ratio and VIIRS Active-Fire Detections in [District], [State], 2021 to 2025

Submitted by: [Name of the learner]

Enrolment No.: [ ]

Study Centre: [Name and code]

Regional Centre: [Name and code]

Year: [ ]

Supervisor: [Name, designation and affiliation]

M.Sc. Geoinformatics (MSCGI)

School of Sciences, Indira Gandhi National Open University, Maidan Garhi, New Delhi 110068

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1. Introduction

Burning of paddy residue after the kharif harvest is a recurring source of smoke over north-west India in October and November. India monitors these fires mainly as counts of satellite active-fire detections. The Indian Agricultural Research Institute (IARI), through its CREAMS laboratory, publishes daily fire event data for Punjab, Haryana, Delhi, Uttar Pradesh, Madhya Pradesh and Rajasthan (https://creams.iari.res.in, accessed [date]).

Counts and burnt area measure different things. An active-fire detection records a fire that is burning when a satellite passes. The Suomi NPP satellite that carries the VIIRS sensor crosses the equator at about 1:30 pm and 1:30 am local time (Schroeder et al., 2014). A field burnt at 5 pm leaves a burn scar but may produce no detection at all. The Stubble Burning Status Report 2025 of the International Forum for Environment, Sustainability and Technology, as reported by the Press Trust of India on 8 December 2025, found that more than 90 per cent of large farm fires in Punjab in 2024 and 2025 occurred after 3 pm, against 3 per cent in 2021, and that active-fire counts suggest a much larger decline than burnt-area mapping does (The Week, 2025).

Statement of the problem. In [District], fire counts for the post-monsoon season have [fallen / risen] between 2021 and 2025 [cite the CREAMS figures you download]. It is not known whether the burnt paddy area in the district changed in the same direction and by the same proportion. This study maps the burnt area directly from Sentinel-2 imagery and compares it with VIIRS 375 m detections for the same seasons.

Research questions. (1) How much paddy area in [District] was burnt in each post-monsoon season from 2021 to 2025? (2) Does the year-to-year change in burnt area follow the change in VIIRS detections? (3) How accurate is the burnt-area map when checked against ground truth?

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[Your Introduction: about four pages, with at least 25 latest references, as section 1.7 (ii) asks.]

2. Literature Review

Active-fire products locate thermal anomalies. Schroeder et al. (2014) describe the VIIRS 375 m algorithm, which detects fires by day and by night and responds to smaller fires than the 750 m and 1 km products that came before it. Archive detections can be downloaded from NASA FIRMS, with VIIRS S-NPP 375 m data available from 20 January 2012 (NASA FIRMS, n.d.).

Burn scars are mapped from reflectance. Key and Benson (2006) defined the Normalized Burn Ratio from near-infrared and short-wave infrared bands and differenced it between pre-fire and post-fire images (dNBR) to gauge the change caused by fire. Sentinel-2 carries the bands this needs at 20 m: B8A at 865 nm and B12 at 2190 nm, with a five-day revisit when two satellites operate (ESA, n.d.).

A map is useful only with a measured error. Olofsson et al. (2014) recommend a probability sample of reference points, an error matrix reported in proportions of area, and confidence intervals for both accuracy and area. Congalton and Green (2019) set out how reference data are collected in the field and from imagery.

[Your review: about six pages, 25 to 30 latest studies on crop-residue burning, burnt-area indices, Indian studies of the Indo-Gangetic plain and accuracy assessment, written as connected prose and ending with the research gap. Appendix III, point 7, asks that the review is not in bullet points.]

3. Rationale of the Study

If fire counts are read as the whole picture, a fall in counts can be taken as a fall in burning when the burnt area has changed much less. A district-level burnt-area series, checked in the field, gives the agriculture department and the pollution control board a second measure. The study uses only the free

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and open source software and data that the Common Prospectus (July 2026) says the MSCGI programme encourages, so it can be repeated in other districts.

4. Objectives

- To map the burnt paddy area of [District] for each post-monsoon season from 2021 to 2025 using Sentinel-2 dNBR.
- To compare the burnt area with VIIRS 375 m active-fire detections for the same district, blocks and seasons.
- To assess the accuracy of the burnt-area maps against ground-truth and high-resolution reference points.

Hypothesis. $H_0$1: There is no monotonic association between block-level VIIRS detections and block-level burnt area in [District] (Spearman's rho = 0).

Operational definitions. Post-monsoon season: [1 October] to [30 November] of each year. Burnt paddy pixel: a 20 m pixel inside the paddy mask whose dNBR is at or above the threshold fixed from training samples. Active-fire detection: a VIIRS 375 m point of nominal or high confidence inside the district boundary.

5. Research Methodology

Research design. Quantitative, descriptive and comparative, using a five-season image time series and a stratified random reference sample.

Study area. [District], [State]: [area in sq km], [number] blocks, [paddy area from the state agriculture department, with year and source]. A location map will be prepared in Chapter 4 of the report.

Data sources (links and dates accessed, as section 1.7 (vi) asks):

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Data	Resolution	Source and link	Accessed on
Sentinel-2 MSI Level-2A surface reflectance	20 m (B8A, B12)	Copernicus Data Space Ecosystem, https://dataspace.copernicus.eu	[date]
VIIRS 375 m active fire (S-NPP, NOAA-20)	375 m points	NASA FIRMS archive, https://firms.modaps.eosdis.nasa.gov/download/	[date]
Paddy cropland mask	[ ]	[name the source]	[date]
District and block boundaries	Vector	[name the source]	[date]
Ground truth points	GPS points	Own field survey, [dates]	n/a

Software. QGIS [version] and [Google Earth Engine or SNAP]; spreadsheet for the accuracy tables.

Processing. (1) Select a pre-fire image ([late September]) and a post-fire image ([late November]) for each year with [under 20] per cent cloud over the district; mask clouds with the Level-2A scene classification layer. (2) Compute NBR = (B8A - B12) / (B8A + B12) and dNBR = NBR(pre) - NBR(post). (3) Fix the burnt threshold from [ ] training polygons per year and apply it inside the paddy mask. (4) Count VIIRS points of nominal and high confidence per block and season. (5) Summarise burnt area per block and season.

Sample size and sampling. Reference points will be drawn by stratified random sampling with the map classes (burnt, unburnt paddy) as strata, following Olofsson et al. (2014). The total n will be computed from their Equation 13 with a target standard error of [0.01 to 0.02] for overall accuracy, and each class will receive at least 50 points, the rule of thumb for a minimum per map class discussed by Congalton and Green (2019). Planned n = [ ].

Ground truth. [ ] points will be visited within [ ] days of the post-fire image, with GPS location, a photograph and the field condition (burnt, ploughed, standing stubble, sown). Points not reachable will be labelled

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from high-resolution imagery and marked as such. A reference letter from the Study Centre or Regional Centre (Handbook Annexure F) will be sought if agriculture department records are needed.

Analysis. Error matrix in proportions of area; overall, user's and producer's accuracy; area-adjusted burnt area with 95 per cent confidence intervals (Olofsson et al., 2014); Spearman's rho between block-level detections and burnt area for $H_0$1.

Data formats and standards. Rasters as GeoTIFF, vectors as GeoPackage, coordinate system WGS 84 / UTM zone [ ]; metadata recorded for every layer.

Limitations. Cloud may remove some post-fire dates; ploughing soon after burning can lower dNBR; fields smaller than a 20 m pixel may be missed; VIIRS detects fires only at its overpass times.

[Your Methodology: about five pages with illustrations and the studies that support each method.]

6. Time Schedule

Months	Activity
[1 to 2]	Literature review, data download, paddy mask
[3 to 4]	dNBR processing for five seasons; VIIRS counts
[5]	Field visits for ground truth during the post-monsoon season
[6 to 7]	Accuracy assessment, area estimates, hypothesis test
[8 to 9]	Chapter drafts shown to the supervisor
[10]	Final report, binding or upload, as the route for that session requires

Section 1.1 of the Handbook gives a minimum of 240 hours, completed within one year if started in the third semester or six months if started in the fourth. Agree your dates with your supervisor.

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7. References

Bhatta, B. (2013). *Research methods in remote sensing*. SpringerBriefs in Earth Sciences. Springer.

Congalton, R. G., & Green, K. (2019). *Assessing the accuracy of remotely sensed data: Principles and practices* (3rd ed.). CRC Press.

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Olofsson, P., Foody, G. M., Herold, M., Stehman, S. V., Woodcock, C. E., & Wulder, M. A. (2014). Good practices for estimating area and assessing accuracy of land change. *Remote Sensing of Environment, 148*, 42-57. https://doi.org/10.1016/j.rse.2014.02.015

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The Week. (2025, December 8). *Satellites missing most farm fires in Punjab, Haryana; impact on Delhi highly underestimated: Report* (PTI). https://www.theweek.in/wire-updates/national/2025/12/08/del43-env-stubble-burning-report.html

[Add your own 25 to 30 latest references here, in APA style and alphabetical order.]

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