



Isabgol Crop Monitoring

Acreage Estimation & Yield Forecast



Rabi Season 2025-26

Gujarat • Rajasthan • Madhya Pradesh



Report up to 15 February 2026



In Collaboration with



Scope of Work

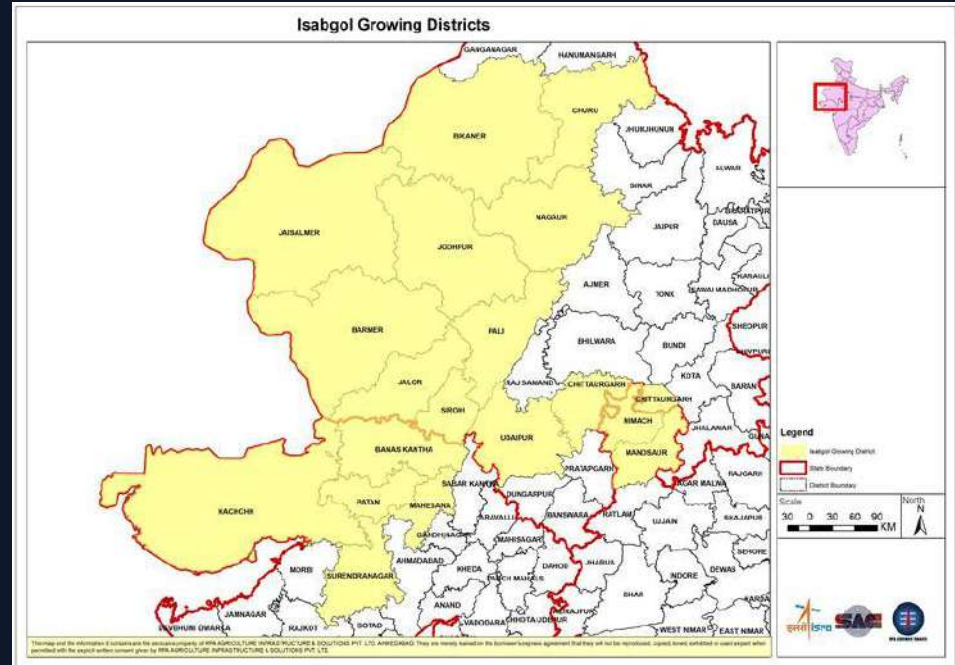
- Ground Truthing(Field Data collection)
- District-Level Isabgol Classification Maps
- Statistical Yield Analysis & Results
- State-wise Acreage & Yield Comparison
- Summary Reports



Study Area Overview

Isabgol cultivation across three major producing states in India

- Gujarat: 5 districts
- Rajasthan: : 11 District
- Madhya Pradesh: 2 District



Field Data Collection:

- Mobile app-based data capture
- Geo-tagged photographs
- Crop stage documentation
- Farm details and metadata recording
- Total: 3000+ georeferenced field samples



Ground Truthing (Field) Data Collection

- Digitally Data collection Using Mobile app
- Collected Details: Lat-long, Mapping, Address, Crop Name, Crop Photos

A screenshot of the 'Add Crop' form in the mobile application. The form includes the following fields and options:

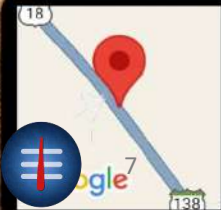
- Crop Name: Isabgol
- Crop Variety: Other (dropdown menu)
- Date of Sowing: 20/12/2024
- Irrigation Method: Flood (selected), Rain, Sprinkler, Drip
- Farming Method: Chemical, Hybrid (selected), Organic
- Crop Season: Monsoon, Winter (selected), Summer, Other, Not Applicable

A blue 'Submit' button is located at the bottom of the form.

Field Data Collection



Field Data Collection



Amnagar Gujarat India

6X34+C8Q, Amnagar, Gujarat 382150, India

Lat: 23.20 | Long: 71.96

Mon, 12 Jan 4:51 pm, IST



Manpur Gujarat India

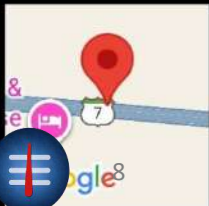
GJ SH 7, Manpur, Gujarat 363210, India

Lat: 23.03 | Long: 71.66

Mon, 12 Jan 11:32 AM, GMT+5:30



Field Data Collection

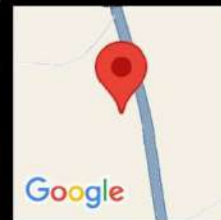


Bhadena Gujarat India

3VMX+M72, GJ SH 7, Bhadena, Moti
Majethi, Gujarat 363765, India

Lat: 23.08 | Long: 71.90

Mon, 12 Jan 10:35 am, IST



Surendranagar Gujarat India

GJ SH 19, Gujarat 363765 India

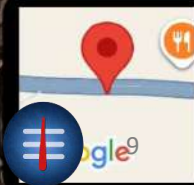
Lat: 23.24 | Long: 71.77

Mon, 12 Jan 3:28 pm, IST





Field Data Collection



Vadgas Gujarat India

GJ SH 7, Vadgas, Gujarat 382150, India

Lat: 23.08 | Long: 71.92



Moti Majethi Gujarat India

03, Moti Majethi Check Post
Pase, Ahmedabad, Highway, Moti

Lat: 23.08 | Long: 71.90

Mon, 12 Jan 10:34 AM



Field Data Collection



GPS Map Camera

Roopana Jaitana, Rajasthan, India



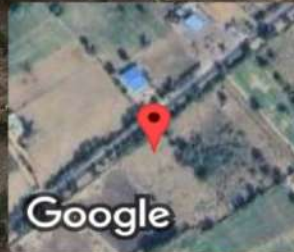
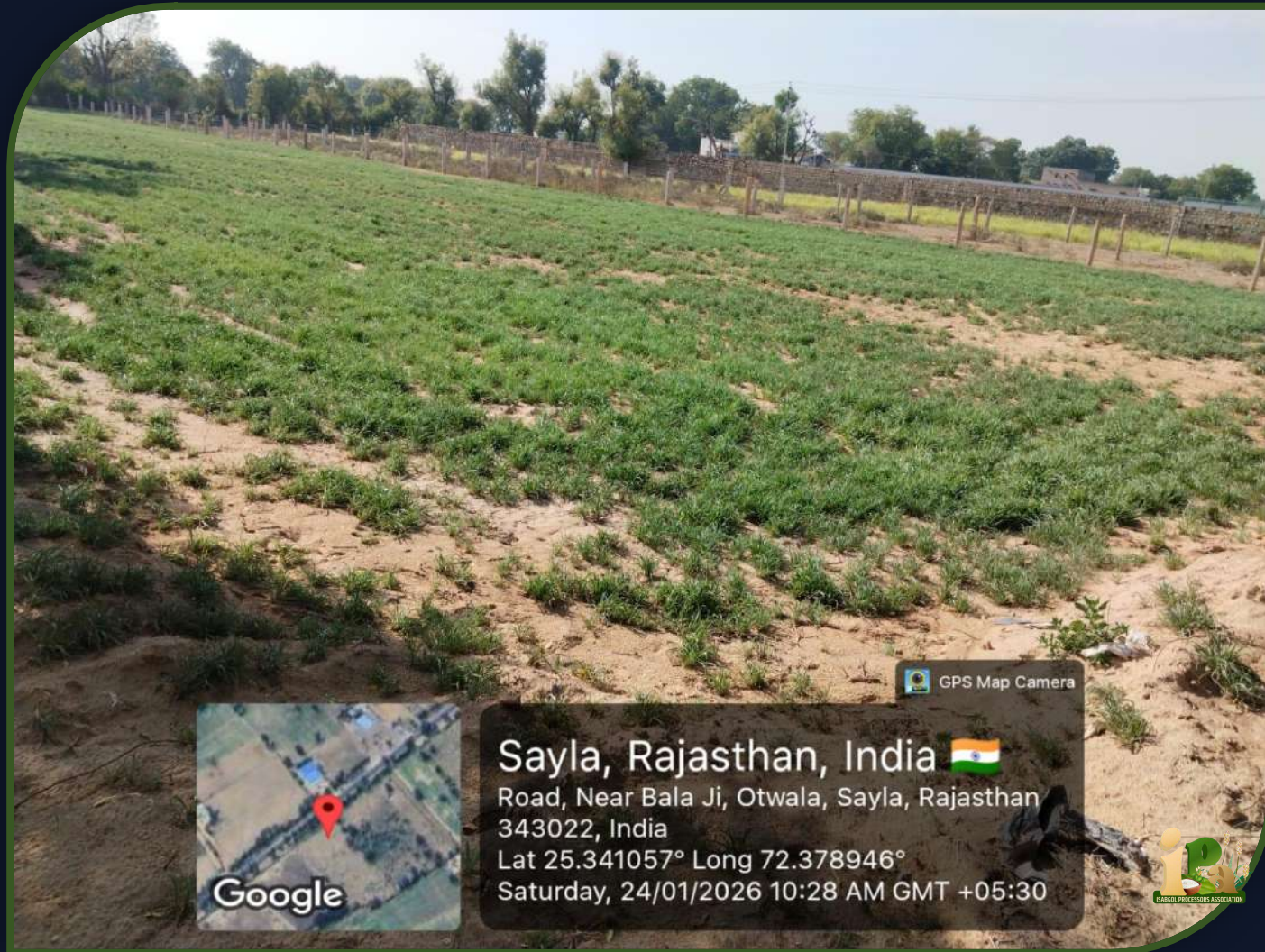
Sh 61, Roopana Jaitana, Rajasthan 342302, India

Lat 27.002953° Long 72.53433°

Wednesday, 21/01/2026 05:33 PM GMT +05:30



Field Data Collection



GPS Map Camera

Sayla, Rajasthan, India 

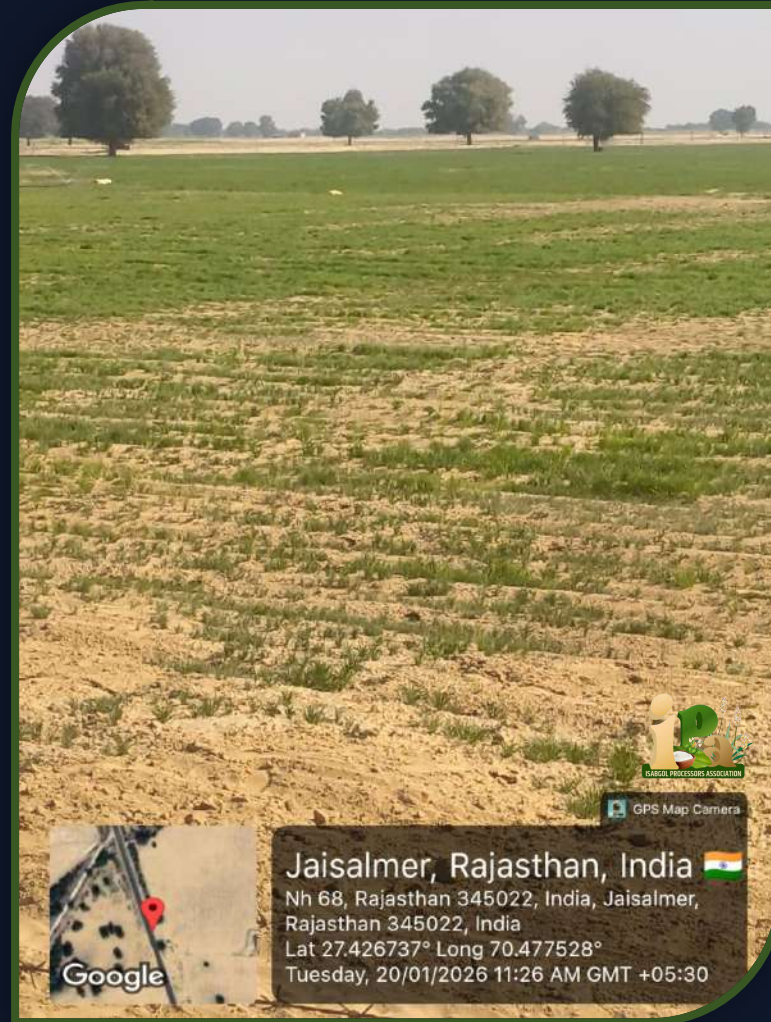
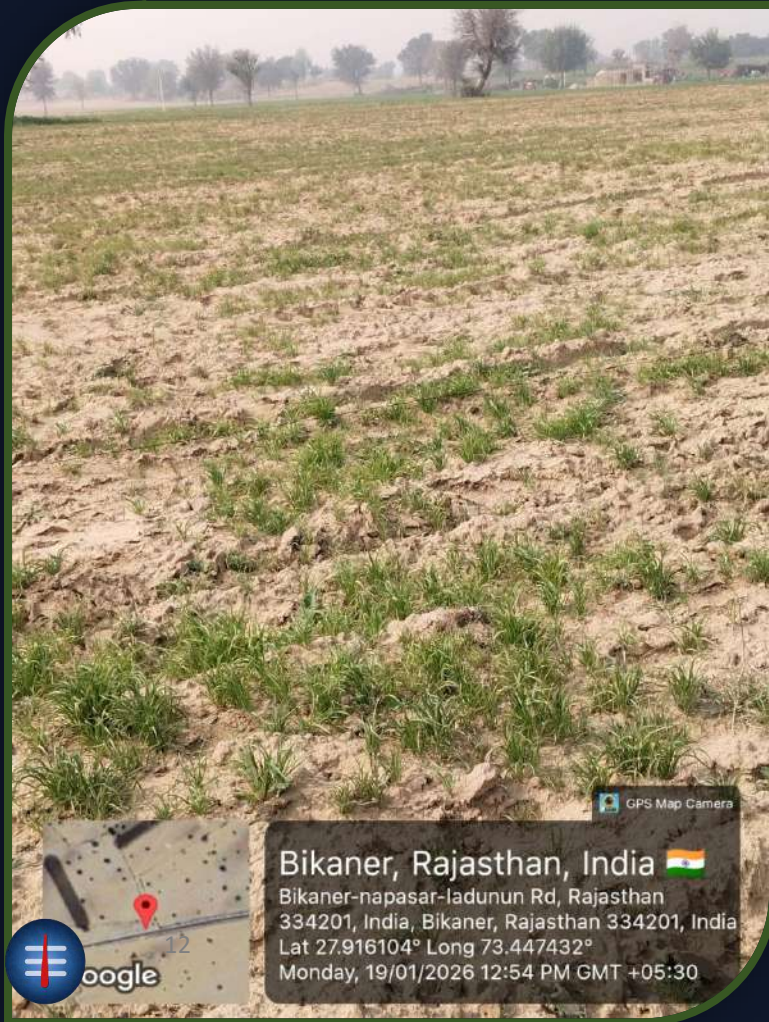
Road, Near Bala Ji, Otwala, Sayla, Rajasthan
343022, India

Lat 25.341057° Long 72.378946°

Saturday, 24/01/2026 10:28 AM GMT +05:30



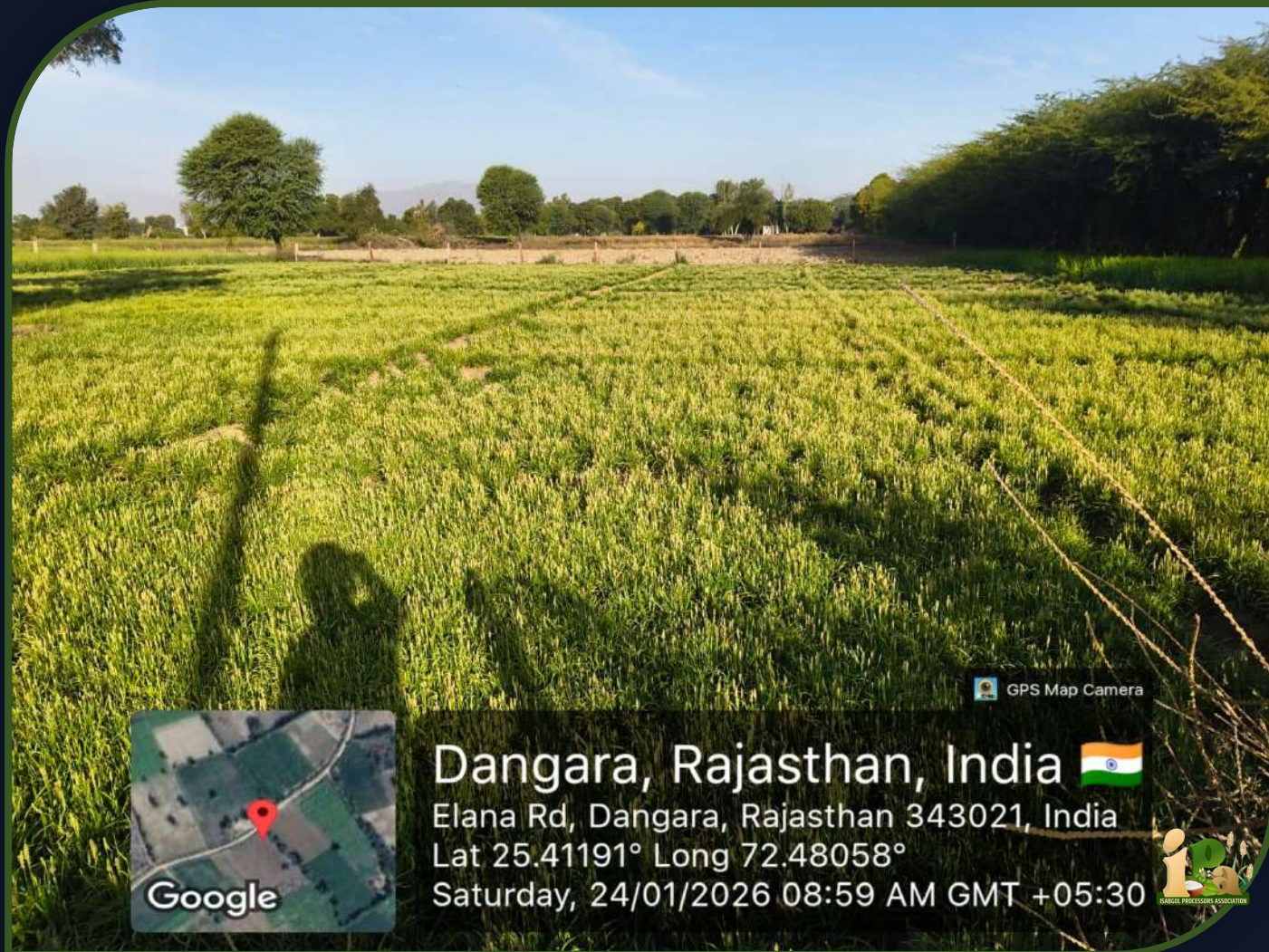
Field Data Collection



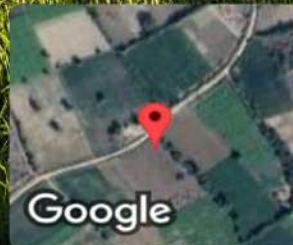
Field Data Collection



Field Data Collection



GPS Map Camera



Dangara, Rajasthan, India 

Elana Rd, Dangara, Rajasthan 343021, India

Lat 25.41191° Long 72.48058°

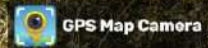
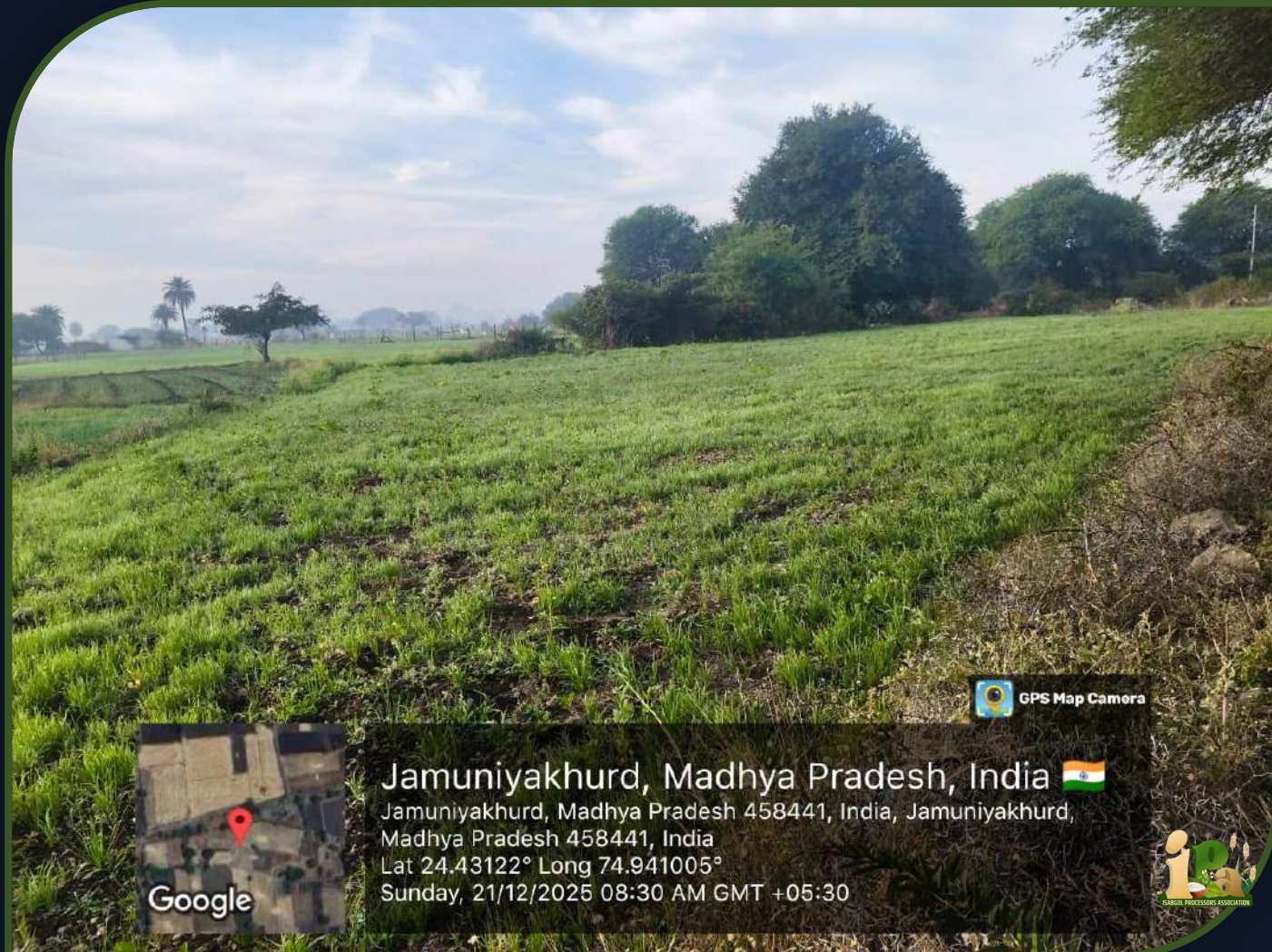
Saturday, 24/01/2026 08:59 AM GMT +05:30



Field Data Collection



Field Data Collection



Jamuniyakhurd, Madhya Pradesh, India 

Jamuniyakhurd, Madhya Pradesh 458441, India, Jamuniyakhurd,
Madhya Pradesh 458441, India

Lat 24.43122° Long 74.941005°

Sunday, 21/12/2025 08:30 AM GMT +05:30



Field Data Collection

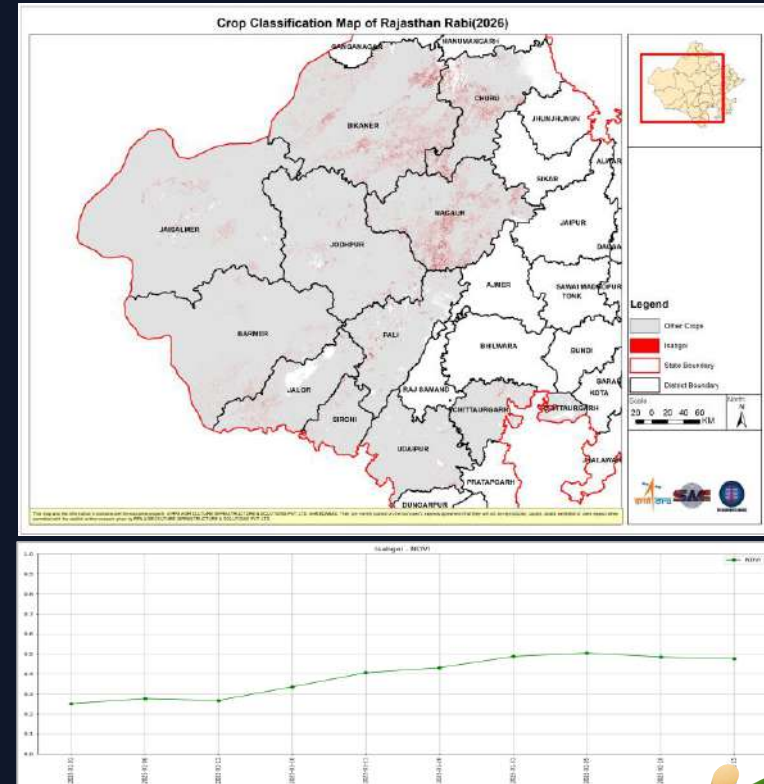
No	Data collection Month	State	Crop Name					
			Isabgol	Cumin	Wheat	Chickpea	Other Crop	Total
1	Dec-25	MP	22	0	259	212	306	799
2	Dec-25	Guj	9	29	80	22	310	450
3	Jan-26	Raj	223	219	506	251	686	1885
Total			254	248	845	485	1302	3134



Methodology Overview

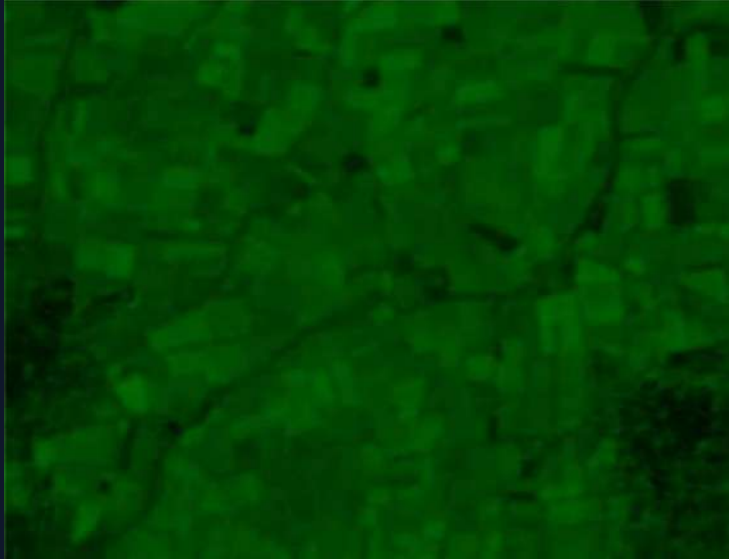
Integrated satellite-based crop monitoring approach

- Multi-temporal satellite data acquisition (Oct 2025 to Feb 2026)
- Spectral signature analysis
- Machine Learning based SVM and Decision Tree model and do Isabgol Identification.
- Overall Classification accuracy: 85%+



Data Collection: Satellite Data Acquisition

Satellite imagery from Sentinel-2 was used, covering the entire crop cycle. Preprocessing steps and spectral indices like NDVI and SAVI were applied.



Satellite – NDVI Image (01 Feb – 05 Feb)

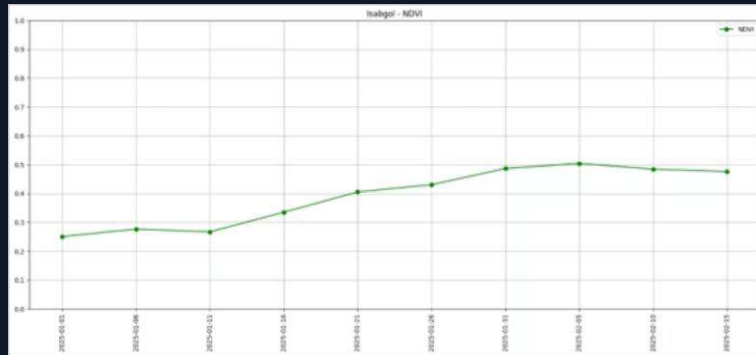


Satellite – SAVI Image (01 Feb – 05 Feb)

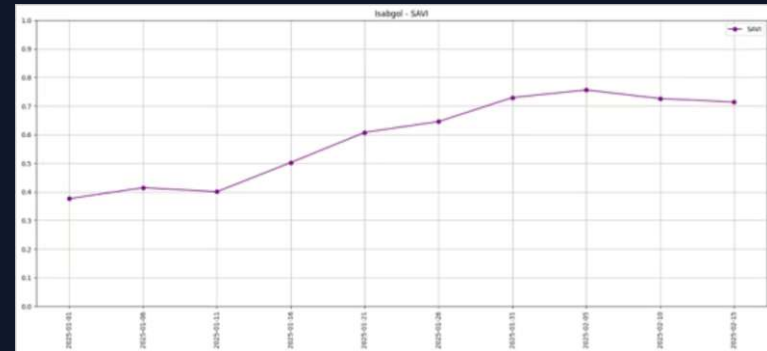


Image Preprocessing & Feature Extraction

Sentinel-2 imagery was preprocessed, including cloud removal and NDVI time-series mosaic construction. To distinguish Isabgol from other crops, relevant features were extracted from the pre-processed NDVI and SAVI time-series data. The spectral characteristics of Isabgol were analyzed by plotting NDVI and SAVI values over time, capturing key phenological stages such as sowing, vegetative growth, flowering, and maturity.



Isabgol NDVI Signature

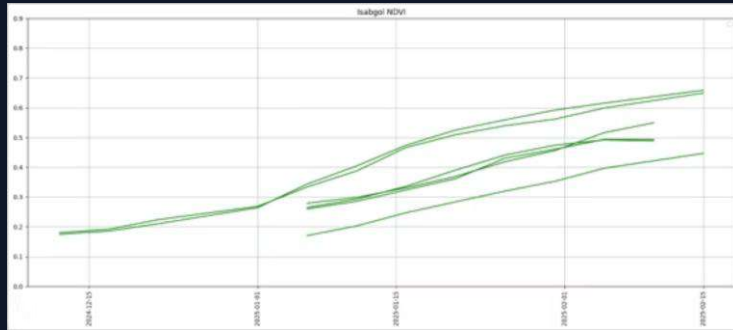


Isabgol SAVI Signature

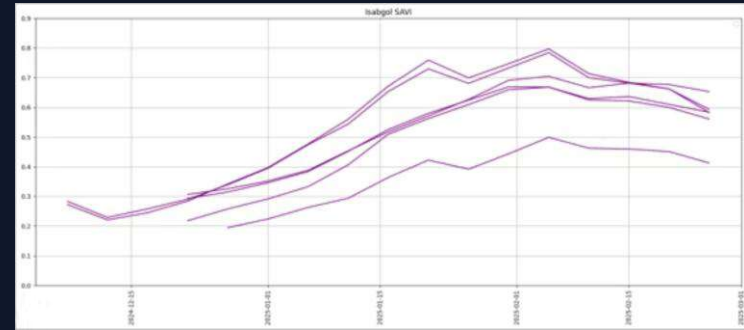


Image Preprocessing & Feature Extraction

Multiple NDVI and SAVI spectra were plotted for Isabgol to observe variations within the crop across different fields. Additionally, a comparative analysis was conducted by plotting NDVI and SAVI signatures of Isabgol alongside other crops. This helped in identifying distinguishing spectral patterns that are unique to Isabgol, aiding in classification and crop mapping.



Isabgol NDVI Signature
multidate Isabgol
Satellite based NDVI Signature

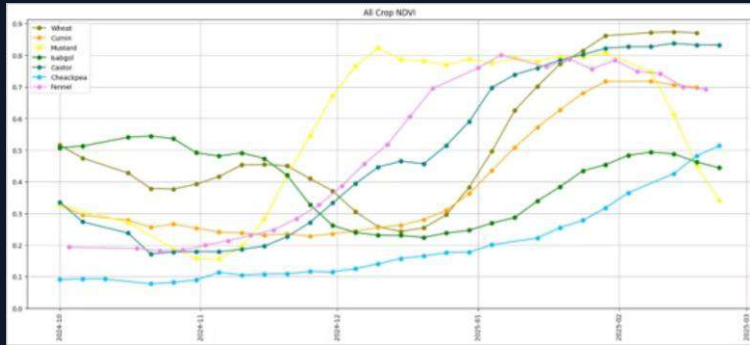


multidate Isabgol Satellite based SAVI Signature

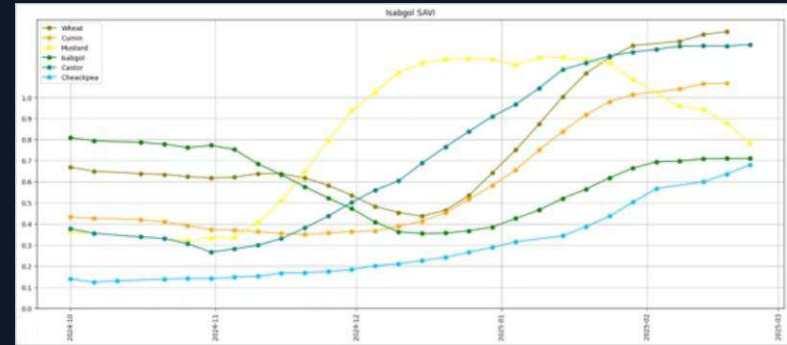


GT Data Integration and Dataset Creation:

Ground Truth (GT) Data Integration and Dataset Creation: to train and validate the machine learning models, ground truth (GT) polygon points were overlaid on the NDVI time-series mosaic. The NDVI values corresponding to these GT locations were extracted, forming the core dataset.



Isabgol and Other crops NDVI signature



Isabgol and Other crops SAVI signature



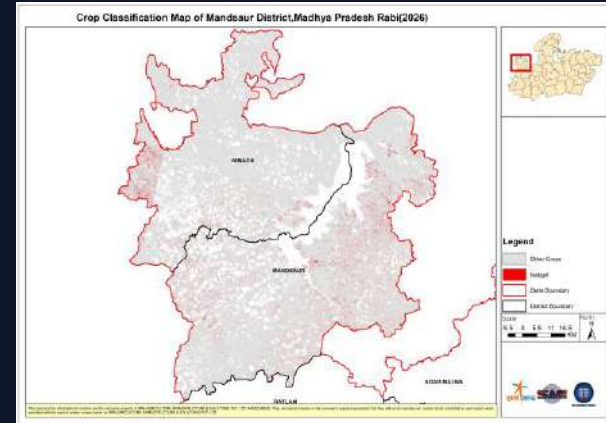
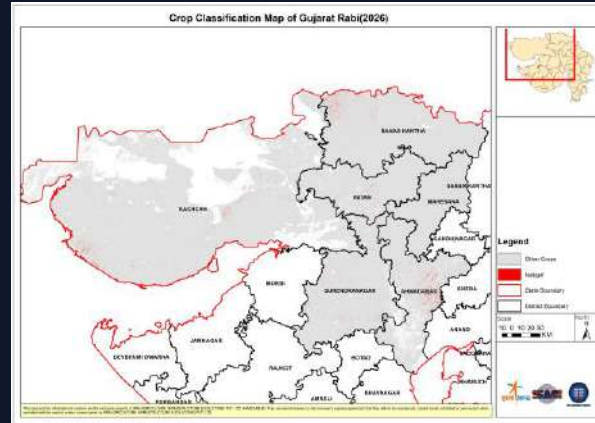
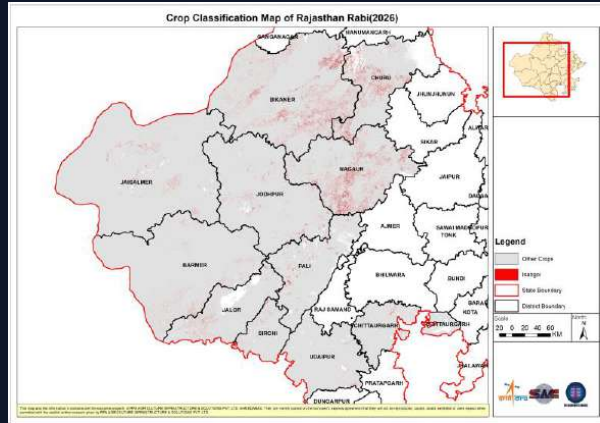
Methodology: AI/ML Model for Isabgol Identification

A two-stage machine learning approach using Support Vector Classifier (SVC) and Decision Tree models was employed for accurate classification.

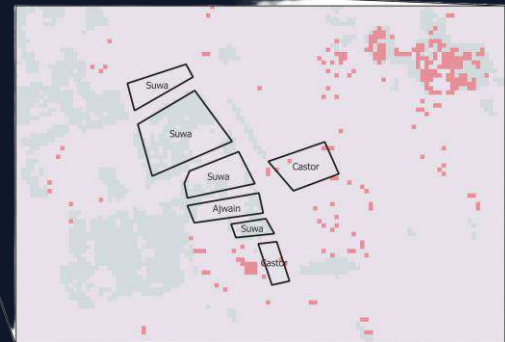
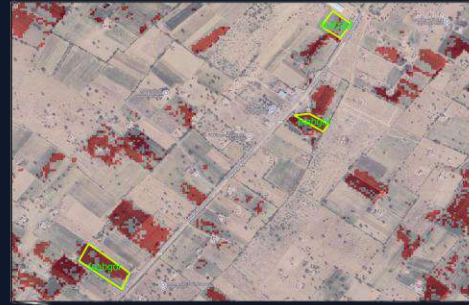
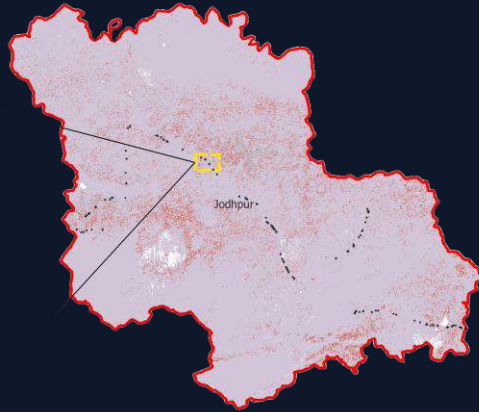
1. **Class Balancing & Data Augmentation:** To mitigate class imbalance in the dataset, we implemented a class balancing strategy. Data augmentation techniques were applied to synthetically enhance the representation of underrepresented crop types, ensuring an even distribution across all classes
2. **Dataset Splitting:** Split into 70% training, 20% validation, and 10% testing for effective model training and evaluation.
3. **SVC Classifier Training & Evaluation:** Trained SVC on training data, validated, and tested, evaluating performance with metrics.
4. **Decision Tree for Fine-Tuning:** Applied Decision Tree to probability-based dataset to improve accuracy for crops with similar spectral signatures.



Isabgol Crop Classification



Results



Gujarat Acreage Statistics

NO	State Name	District Name	Survey 2024-25 (Ha)	Survey 2025-26 (Ha)	Decline (acreage)
1	Gujarat	Banaskantha	8,049.92	7,203.42	-10.52%
2		Kutch	9,819.95	7,447.85	-24.16%
3		Mehsana	242.77	209.79	-13.59%
4		Patan	3,959.00	3,219.28	-18.68%
5		Surendranagar	5,971.33	5,220.45	-12.57%
		Total Gujarat	28,042.97	23,300.78	-16.91%

Satellite Data based Crop Classification acreage



Madhya Pradesh Acreage Statistics

NO	State Name	District Name	Survey 2024-25 (Ha)	Survey 2025-26 (Ha)	Decline (acreage)
1	Madhya Pradesh	Mandsaur	18,408.41	14,358.27	-22.00%
2		Neemuch	6,449.32	5,159.75	-20.00%
		Total MP	24,857.74	19,518.02	-21.48%

Satellite Data based Crop Classification acreage



Rajasthan Acreage Statistics

NO	State Name	District Name	Survey 2024-25 (Ha)	Survey 2025-26 (Ha)	Decline (acreage)
1	Rajasthan	Barmer	21,317.40	16,435.52	-22.90%
2		Bikaner	54,009.05	47,311.87	-12.40%
3		Churu	15,722.06	13,096.46	-16.70%
4		Chittorgarh	3,891.06	3,117.30	-19.89%
5		Jaisalmer	21,460.47	18,069.65	-15.80%
6		Jalore	18,775.13	14,174.95	-24.50%
7		Jodhpur	24,641.56	17,939.34	-27.20%
8		Nagaur	1,06,507.57	92,129.26	-13.50%
9		Pali	8,864.58	7,162.54	-19.20%
10		Sirohi	5,683.35	4,972.78	-12.50%
11		Udaipur	4,377.73	3,349.18	-23.49%
Total Rajasthan			2,85,249.96	2,37,758.85	-16.65%

Satellite Data based Crop Classification acreage



Total Acreage Statistics

NO	State Name	Survey 2024-25 (Ha)	Survey 2025-26 (Ha)	Decline(acrea ge)
1	Gujarat	28,042.97	23,300.78	-16.91%
2	Madya Pradesh	24,858.14	19,518.02	-21.48%
3	Rajasthan	2,85,249.96	2,37,758.85	-16.65%
	Total	3,38,151.08	2,80,577.65	-17.03%

Satellite Data based Crop Classification acreage



Acreage: Accuracy

State	GT	Correct	Wrong	Accuracy	Cohen Kappa
Gujarat	450	378	72	0.84	0.77
Madhya Pradesh	799	687	112	0.86	0.74
Rajasthan	1885	1469	416	0.78	0.67
Average	1045	845	200	0.83	0.73



Acreage Declined Reasons

- Crop Switching: Attractive prices for cumin and gram
- Unseasonal rain risk during Rabi reduced sowing area
- Profitability + irrigation limits → crop pattern change



Yield Forecasting(Statistical)

Prediction Framework:

- Yield correlation models
- Weather data (rainfall/temp)
- CCE field validation
- GIS data integration
- Machine learning algorithms



Yield Forecasting(Statistical)

Major Reviews:

- Kharif Season: Late sowing and pattern changes observed
- Weather Impact: Generally favorable but stage-specific effects noted
- Plant Population: Average density at block level
- Methodology: Thyson Polygon Method applied
- Yield Prediction: District-level statistical approach
- Data Source: Statistical method (non-satellite based)
- This report is based on data up to 15 February 2026.



Gujarat Yield Forecast 2025-26

NO	State Name	District Name	Survey 2024-25 (Ha)	Survey 2025-26 (Ha)	Decline (acreage)	Yield	Estimated Production
1	Gujarat	Banaskantha	8,049.92	7,203.42	-10.52%	674.31	4,857.34
2		Kutch	9,819.95	7,447.85	-24.16%	649.61	4,838.20
3		Mehsana	242.77	209.79	-13.59%	703.95	147.68
4		Patan	3,959.00	3,219.28	-18.68%	666.90	2,146.94
5		Surendranagar	5,971.33	5,220.45	-12.57%	657.02	3,429.94
Total Gujarat			28,042.97	23,300.78	-16.91%	661.78	15,420.09

Statistical yield Report.



Madhya Pradesh Yield Forecast 2025-26

NO	State Name	District Name	Survey 2024-25 (Ha)	Survey 2025-26 (Ha)	Decline (acreage)	Yield	Estimated Production
1	Madhya Pradesh	Mandsaur	18,408.41	14,358.27	-22.00%	708.89	10,178.43
2		Neemuch	6,449.73	5,159.75	-20.00%	701.48	3,619.46
Total MP			24,858.14	19,518.02	-21.48%	706.93	13,797.89

Statistical yield Report.



Rajasthan Yield Forecast 2025-26

NO	State Name	District Name	Survey 2024-25 (Ha)	Survey 2025-26 (Ha)	Decline(acreage)	Yield	Estimated Production
1	Rajasthan	Barmer	21,317.40	16,435.52	-22.90%	649.98	10,682.77
2		Bikaner	54,009.05	47,311.87	-12.40%	628.62	29,740.95
3		Churu	15,722.06	13,096.46	-16.70%	629.85	8,248.80
4		Chittorgarh	3,891.06	3,117.30	-19.89%	689.13	2,148.22
5		Jaisalmer	21,460.47	18,069.65	-15.80%	649.36	11,733.76
6		Jalore	18,775.13	14,174.95	-24.50%	676.78	9,593.32
7		Jodhpur	24,641.56	17,939.34	-27.20%	699.01	12,539.78
8		Nagaur	1,06,507.57	92,129.26	-13.50%	703.95	64,854.39
9		Pali	8,864.58	7,162.54	-19.20%	728.65	5,218.99
10		Sirohi	5,683.35	4,972.78	-12.50%	728.65	3,623.42
11		Udaipur	4,377.73	3,349.18	-23.49%	753.35	2,523.11
Total Rajasthan			2,85,249.96	2,37,758.85	-16.65%	676.77	1,60,907.51



All state Yield Forecast 2025-26

NO	State Name	Survey 2024-25 (Ha)	Survey 2025-26 (Ha)	Decline (acreage in %)	Yield (in KG)	Production (in MT)
1	Gujarat	28,042.97	23,300.78	-16.91%	661.78	15,420.09
2	Madya Pradesh	24,858.14	19,518.02	-21.48%	706.93	13,797.89
3	Rajasthan	2,85,249.96	2,37,758.85	-16.65%	676.77	1,60,907.51
	Total	3,38,151.08	2,80,577.65	-17.03%	677.62	1,90,125.49

Statistical yield Report.



All state Yield Forecast 2025-26

NO	State Name	Survey 2024-25 (Ha)	Yield (in KG)	Production (in MT)	Total Bag (75 KG)	Survey 2025-26 (Ha)	Decline (acreage in %)	Yield (in KG)	Production (in MT)	Total Bag (75 KG)
1	Gujarat	28,042.97	766.00	21,480.92	2,86,412	23,300.78	-16.91%	661.78	15,420.09	2,05,601
2	Madya Pradesh	24,858.14	705.00	17,524.99	2,33,666	19,518.02	-21.48%	706.93	13,797.89	1,83,971
3	Rajasthan	2,85,249.96	711.00	2,02,812.72	27,04,169	2,37,758.85	-16.65%	676.77	1,60,907.51	21,45,433
	Total	3,38,151.08	715.12	2,41,818.63	32,24,248	2,80,577.65	-17.03%	677.62	1,90,125.49	25,35,006
						Decline			-51692.71	-6,89,242
Statistical yield Report.									-21.38%	





Thank You

Questions & Discussion

OmAgri - Agricultural Intelligence Solutions



connect@omagri.in