

Analysis of Mustard crop with the help of Remote Sensing in Jhajjar District (Haryana) India

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Abstract— Agriculture plays a crucial role in the economy of developing countries, and provides the main source of food, income and employment to their rural populations. With increasing population pressure throughout the nation and the concomitant need for increased agricultural production. This study describes methodology and results of Mustard crop analysis for Jhajjar district of Haryana at District Level. In the present study single-season LANDSAT-8 data with 30 meter resolution of Rabi season 2016-2017 was used. District boundary was overlaid on the image and all the data elements (pixels) within this were extracted for further analysis.

A supervised classification algorithm is used in which the algorithm identifies a classification scheme based on spectral signatures of different bands obtained from "training" sites having known class labels (e.g., land cover or crop types), and The classes of interest and other associated features were identified using ground truth information available in the form of GPS location. Mustard crop map and statistics was generated using classified image. In the Jhajjar district Mustard crop occupied 22.4 thousand hectares area respectively, which is very close to Department of Agriculture (DOA), used average of last three year.

Keywords: Rabi, Landsat-8, Remote Sensing, Ground Control Points

I. INTRODUCTION

Agriculture resources are among the most important renewable, dynamic natural resources. Comprehensive, reliable and timely information on agricultural resources is very much necessary for a country like India whose mainstay of the economy is agriculture. Agriculture plays a crucial role in the economy of developing countries, and provides the main source of food, income and employment to their rural populations. India is an agricultural country. About seventy percent of our population depends on agriculture. One-third of our National income comes from agriculture. India economy is based on agriculture. [1]

In this regard, innovative agricultural research and better management practices are essential to enhance productivity. The assessment of crop production and precise and timely monitoring at multi-scale (community level, regional level and global level) has been a challenge to researchers. However, the efficiency and accuracy of crop monitoring

have improved significantly since 1972 with the availability of satellite based operational remote sensing acquisition. [2] This study describes methodology and results of Mustard crop analysis for Jhajjar district of Haryana at District Level. In the present study single-season LANDSAT 8 data with 30 meter resolution of Rabi season 2016-2017 was used.

II. OBJECTIVES

In the present study we have taken area of Jhajjar in district of Haryana state. The major objectives of this study are:

(1) To generate Mustard crop map and Statistics for the Jhajjar district of Haryana using Temporal Landsat-8 data for the year (2016-17)

III. STUDY AREA

Jhajjar district is one of the 22 districts of Haryana state in northern India. Carved out of Rohtak district on 15 July 1997 and with its headquarters in Jhajjar. Other towns in the district are Bahadurgarh and Badli and Beri. The district occupies an area of 1,834 square kilometres (708 sq mi). Major crops grown here are rice, wheat and maize. The total irrigated agricultural land area is about 670 square kilometres (260 sq mi). As of the 2011 census Jhajjar district had a population of 956,907. The district has a population density of 522 inhabitants per square kilometre (1,350/sq mi).

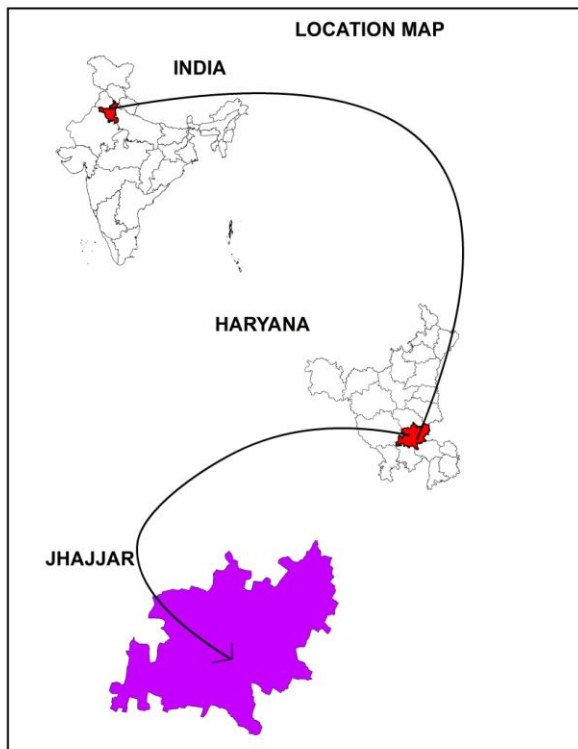
Jhajjar district is divided into 3 sub-divisions: Jhajjar, Bahadurgarh and Beri. Jhajjar sub-division comprises two tehsils: Jhajjar and Matanhail. Bahadurgarh sub-division comprises a lone tehsil, Bahadurgarh and Beri sub-division also comprises only one tehsil, Beri. There are four Haryana Vidhan Sabha constituencies in this district: Bahadurgarh, Badli, Jhajjar and Beri. All of these are part of Rohtak Lok Sabha constituency.

IV. DATABASE REQUIREMENT

The satellite data used in the present study includes the Landsat-8 image with 30 meter resolution in Green, Red,

NIR and SWIR bands. The ground-truth data used for interpretation and accuracy assessment.

close to Department of Agriculture (DOA), used average of last three year.



Map1. Location map of Jhajjar District

IV.I SOFTWARE USED

Arc GIS 9.3: Arc GIS 9.3 software was used for composition and generation of maps.

Microsoft Office: for database preparation.

Erdas Imagine 9.3 In this study ERDAS was used in subsetting and classification image.

IV.II METHODOLOGY

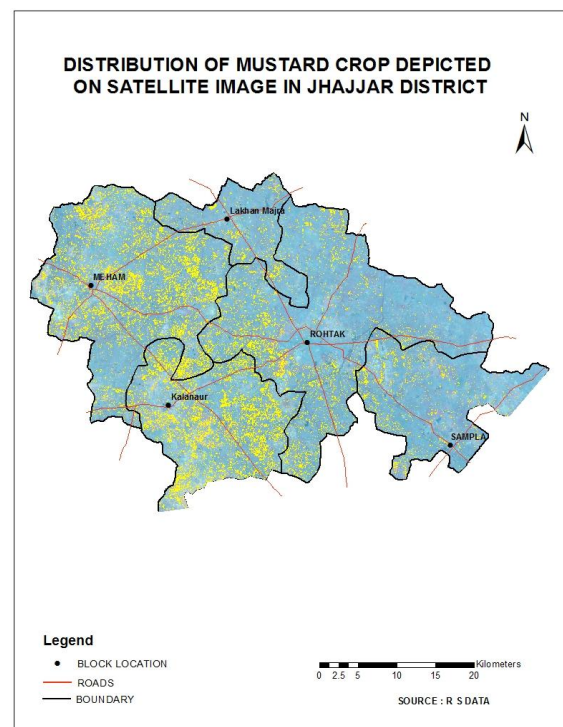
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V. RESULTS AND DISCUSSION

Analysis of remote sensing (RS) data reflected that mustard is the major crops in Rabi season, which could be identified using Single-date Landsat-8 data. Mustard crop is mainly located in western and southern part of the district. R S estimation showed that the mustard occupied 22.4 thousand hector area respectively (Table 1, Figure 2) which is very

Season	Crop	RS Area (000'ha.)	DOA Area (000' ha.) Avg. 3 Years	% RD
RABI	MUSTARD	22.4	25.66	2.5

Table 1: Mustard cropping pattern of Jhajjar District derived from RS Data



Map2 Mustard cropping pattern map of Jhajjar District derived from RS Data

VI. CONCLUSION

This study shows that the maps which are obtained by using Landsat-8 satellite having spatial resolution of 30 M. used to generate mustard crop map for Jhajjar district. RS data analysis showed that mustard is the important crop in Rabi Season. Mustard occupied 22.4 thousand hector are respectively (Table 2 , Figure 2) which are very close to with what obtained from department of Agriculture (DOA) estimates for the Average three last year i.e. 2007-2008 .

VII. REFERENCES

- [1] S. Chen, B. Mulgrew, and P. M. Grant, "A clustering technique for digital communications channel equalization using radial basis function networks," *IEEE Trans. on Neural Networks*, vol. 4, pp. 570-578, July 1993.

- [2] Satyawan, M.Yadav, and R.S.Hooda, "A clustering technique for digital communications channel equalization using radial basis function networks," *IEEE Trans. on Neural Networks*, vol. 4, pp. 570-578, July 1993.
- [3] https://en.wikipedia.org/wiki/Jhajjar_district
- [4] M. P. Sharma, M Yadav, R. Prawasi, P Kumar and R. S. Hooda, (2011), Cropping System Analysis using Remote Sensing and GIS: A Block Level Study of Kurukshetra District, *ARNP Journal of Agricultural and Biological Science*, VOL. 6, NO. 10.
- [5] P Sushma, Hooda R S, Ray S S, Yadav Manoj, Manjunath K R, Sharma M P, Upadhyay Gargi, Kumar M, Panigrahy R K & Miglani Anshu(2008). Cropping system analysis using remote sensing & GIS: