

# **Plantations Mapping of Dabwali, Rania and Ellenabad blocks of Sirsa District Using on Screen Visual Interpretation Approach on WV-2 Data**

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## **Abstract**

A plantation is a long artificially established forest, farm or estate, where crops are grown for sale, often in distant markets rather than for local onsite Consumption. The term plantation is informal and not precisely defined. In the present investigation showing the Plantations (Block and Strip) in Dabwali, Rania and Ellenabad Blocks of Sirsa district on the satellite data of World View-2. The software used ArcMap GIS 9.3, EARDAS 9.3, MS Office & Excel 2007 for this research mapping and presentation. In the methodology there is used On Screen visualization, in on screen visualization, Data mosaicing, Area extraction, on screen digitization, G T collection, Area computation, final Map composition. According to this investigation plantation derived in the study blocks using remote sensing data is 3355.21 hectares. Out of this area recorded 1239.91ha. 764.04, and 1351.26 ha. in Dabwali, Rania and Ellenabad Blocks respectively. Total Plantation area derived in the study blocks amounted to 3355.21 hectares. Among the total area 1048.08ha is under block plantation and 2307.13ha is under the strip plantation. Strip and block plantation contributes 32% and 68% area respectively.

**Key words:-** Plantation, Remote sensing, On screen visualization, Strip and Block plantation, World View-2, Arc Map GIS 9.3, EARDAS 9.3.

## **1. INTRODUCTION**

A plantation is a long artificially established forest, farm or estate, where crops are grown for sale, often in distant markets rather than for

local on-site consumption. The term plantation is informal and not precisely defined.

The term "plantation" has usually not included large orchards (except for banana plantations), but does include the planting of trees for lumber. A Plantation is always a monoculture over a large area and does not include extensive naturally occurring stands of plants that have economic value. Because of its large size, a plantation takes advantage of economies of scale. Plantation agriculture grew rapidly with the increase in international trade and the development of a worldwide economy that followed the expansion of European colonial empires. Like every economic activity, it has changed over time. Earlier forms of plantation agriculture were associated with large disparities of wealth and income, foreign ownership and political influence, and exploitative social systems such as indentured labor and slavery.

Remote Sensing is one of the emerging advanced tools to gather accurate information on many parameters required for development of plantation sector. A large number of remote sensing applications projects carried out in the country have proved the pre-eminence achieved by India in utilizing the remote sensing technology in different facets of natural resources management and development. A number of studies have been carried out in the field of plantation, aiming at identification of crop, area estimation,

condition assessment etc.using Indian Remote Sensing Satellite (IRS) data. (Dr.SushmaPanigrahy et al, 2008)

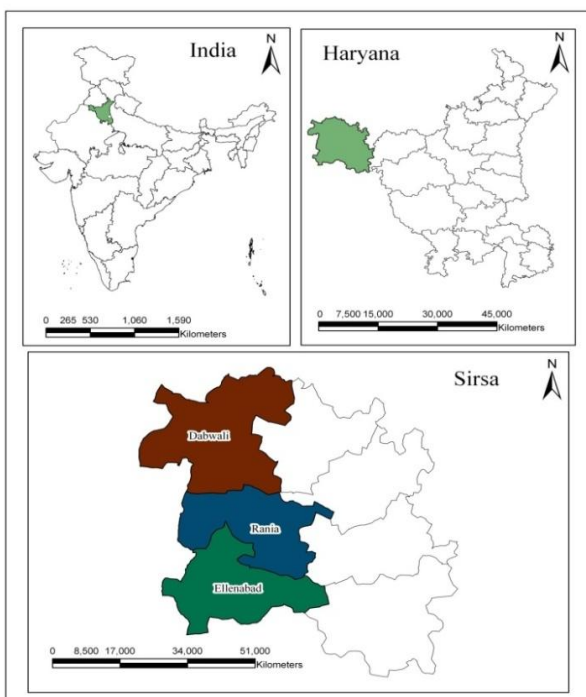
### Objectives of Study:

- Mapping of plantation site in the given study area using WORLD VIEW-2 Data.
- Mapping of Block and Strip Plantation in study area using on screen visualization approach.

### 2 STUDY AREA:

The location of the Sirsa district is 29°14' to 29°59' north latitude and 74°27'to 75°18' east longitude. The Geographical area of the district is 4,277 sq. km. It is surrounded by Muktsar, Bathinda & Mansa districts of Punjab in the north, Ganga Nagar & Hanumangarh districts of Rajasthan in West and South, Fatehabad and Hisar districts of Haryana in north east and southeast respectively. The district administratively divided into seven development blocks namely Sirsa, Dabwali, Odhan, Baragudha, Nathusari Choupta, Rania & Ellenabad. Three blocks namely Dabwali, Rania and Ellenabad were selected for the present study.

#### MAP: 1 STUDY AREA MAP



### 3. MATERIAL & METHODOLOGY

For doing any research work various kinds of data are required for fulfil our research purposes. Therefore various kinds of data were used in study which is briefly described below:

#### 3.1. SATELLITE DATA

Remote sensing data is the basic data source for Plantation mapping of the study area. World view-2 data is used for the present study applying onscreen visual interpretation World view-2 sensor provide 2 meter spatial resolution data with 8 bands .

#### 3.2. ANCILLARY DATA

1. Administrative boundary (district & blocks).
2. Statistics at district & blocks level of Dept. of Forest
3. In season collected ground truth data.

#### 3.3. SOFTWARE USED

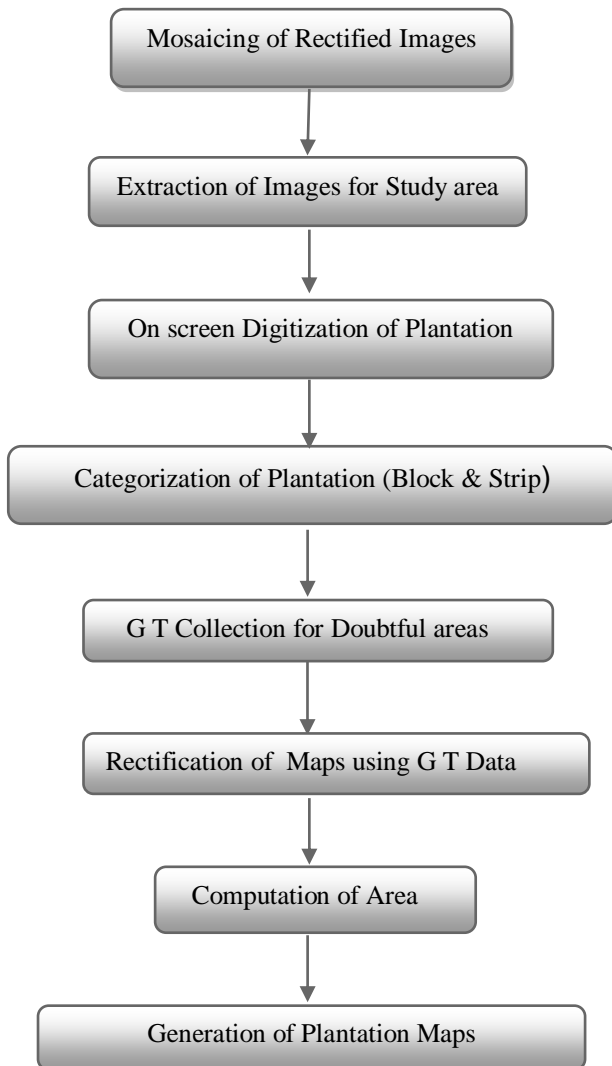
**3.3.1. ERDAS IMAGINE 9.1:** In this study ERDAS was applied in importing image subsetting, mosaicing, Geo-referencing and image rectification.

**3.3.2. ARC-GIS 9.3:** This software was used for visual interpretation and map composition.

**3.3.3. MS OFFICE 2007:** For the current study we use Microsoft Office in Report & Graph generation.

### 3.4. METHODOLOGY

Figure: 3.1 Methodology flow chart of visual Interpretation



### 4. RESULT & DISCUSSION

Plantation mapping was done for Dabwali, Rania and Ellenabad blocks of Sirsa district. On available data World View-2, 8 band multispectral data having spatial resolution 2 meter was explored to assess the best dataset for such type of studies. Single analysis approaches onscreen visual interpretation using high resolution World View- 2 data explored and the results from this approach was compared.

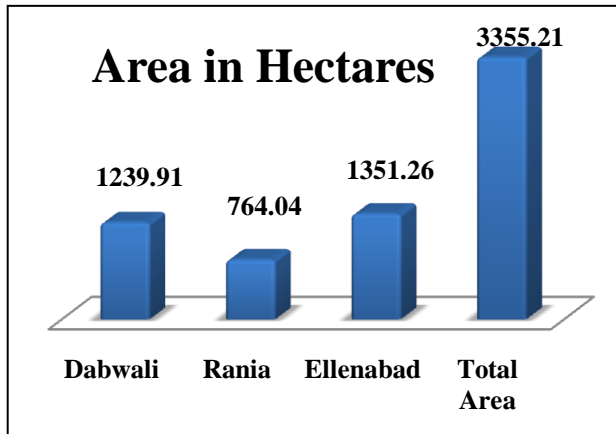
### 4.1 PLANATION MAPPING USING ON SCREEN VISUAL INTERPRETATION APPROACH

Multi-spectral World View-2 digital data was displayed and plantation area under different categories such as strip plantation along with roads and canals, block plantation and community plantation were delineated. Most of the plantation area delineated is mixed in nature where all types of tree varieties are available. Different enhancements techniques were used to identify and delineated plantations. Kikar, Shisham, Neem, Eucalyptus, Jandi etc. are the major tree varieties in the delineated plantation of the study area. Block wise area of plantation given in Table 4.1 and in Figure 4.1. Spatial distribution of plantations depicted in Map 4.1. Total plantation area derived in the study blocks using remote sensing data is 3355.2121 hectares. Among the total area 1048.08 ha. of this area recorded 1239.91 ha. 764.04, and 1351.26 ha. in Dabwali, Rania and Ellenabad Blocks respectively.

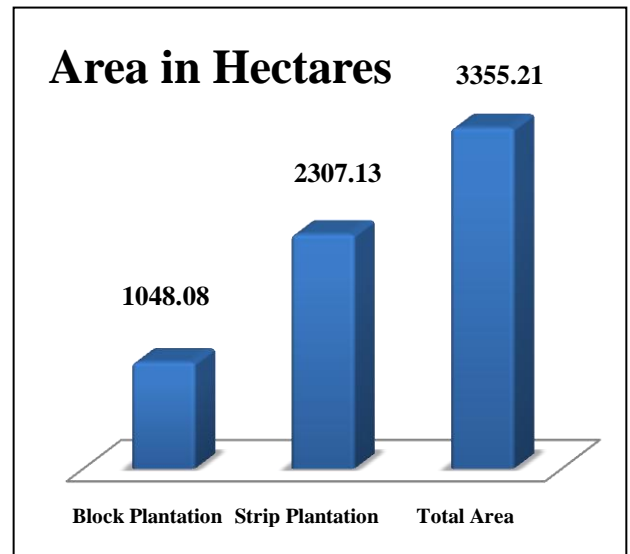
**Table 4.1. Plantation area in different blocks of sirsa district**

<b>Plantation Area</b>	<b>Area in Hectares (RS)</b>
Dabwali	1239.91
Rania	764.04
Ellenabad	1351.26
<b>Total</b>	<b>3355.21</b>

**Figure 4.1: Plantation Area in Different Blocks of Sirsa District**

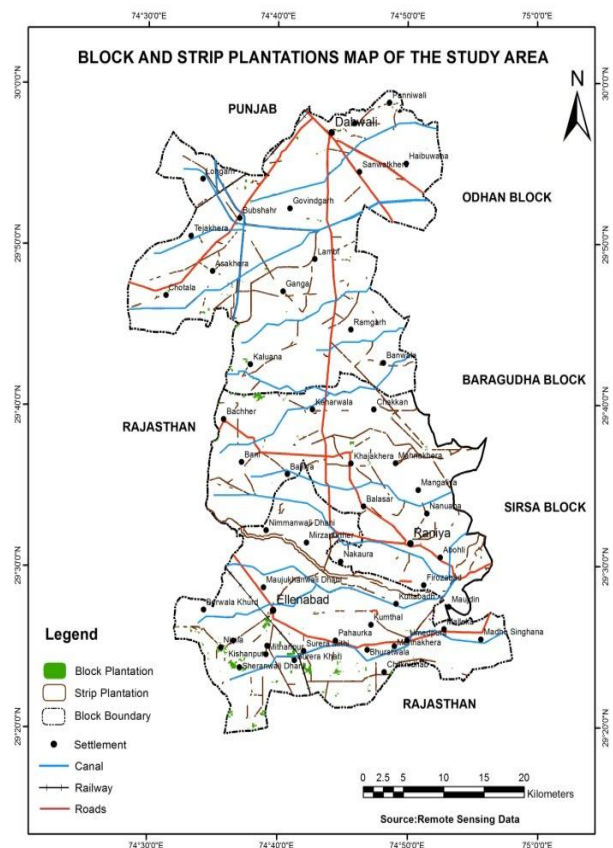


**Figure 4.2 Area under Different Categories of Plantation in the Study Area**



The plantation was categorized in to two categories i.e. Block plantation and Strip plantation. The block plantation is mainly concentrated near the villages and sandy wastelands. The strip plantation was available along the major roads and canals. Total Plantation area derived using remote sensing data in the study blocks amounted to 3355.21 ha. Out of the total 3355.21ha area of plantations, 2307.13 ha are under strip plantation and 1048.08 ha is under the block plantation (Table 4.2, Figure 4.2). Out of total plantation Strip and block plantation contributes 68% and 32% area, respectively. The south west part of the study area mainly consists of block plantation. Spatial distribution of different type of plantation is depicted in Map 4.2.

**Map 4.1: Area under Different Categories of Plantation in the Study Area**



**Table 4.2 Area under Different Categories of Plantation in the Study Area**

Plantation	Area in Hectares (RS)	% of total plantation
Block Plantation	1048.08	32
Strip Plantation	2307.13	68
<b>Total Area</b>	<b>3355.21</b>	<b>100</b>

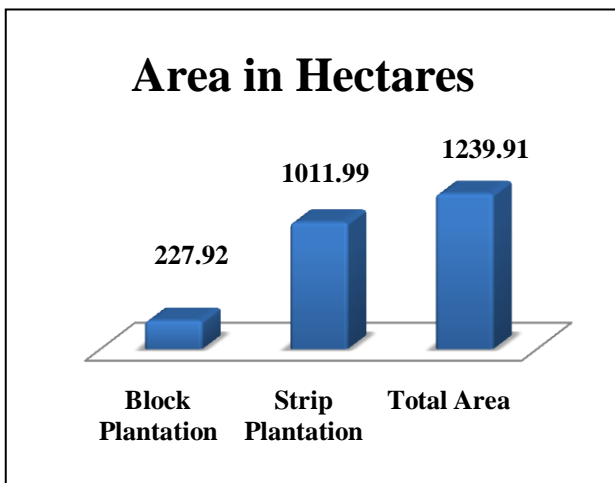
### 4.2 Block and Strip Plantation Mapping of Dabwali Block

The total geographical area of the block is 832.63sq.km. The Area under Plantation is 1239.91 ha which only 1.5% of the total geographical area is. Out of the total plantation 1011.99 ha is under strip plantation and 227.92 ha is under block plantation (Table 4.2, Figure 4.2). Out of total plantation Strip and Block plantation contributes 82% and 18% area respectively. The strip plantation is scattered in the block whereas the block plantation is mainly concentrated in south west part of the block. Spatial distribution of different type of plantation is depicted in Map 4.2.

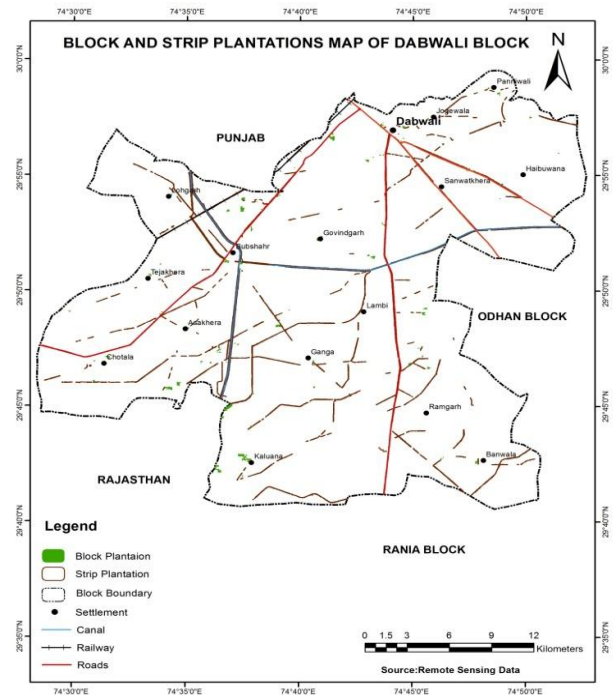
**Table 4.2: Area under Different Categories of Plantation in the Dabwali Block**

Plantation	Area in ha (RS)	% of total plantation
Strip Plantation	1011.99	82
Block Plantation	227.92	18
<b>Total Area</b>	<b>1239.91</b>	<b>100</b>

**Figure 4.2: Area under Different Categories of Plantation in Dabwali Block**



### Map 4.2: Block and Strip plantations map of Dabwali block



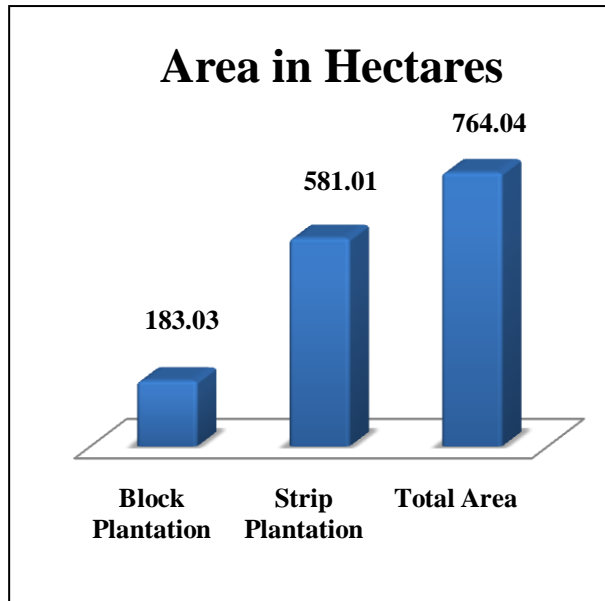
### 4.3 Block and Strip Plantations Mapping of Rania Block

The total geographical area of the block is 558.30sq.km. The Area under plantation recorded is 764.04ha which is only 1.36% of the total geographical area of the block. Out of the total plantation area 581.01 ha is under strip plantation and 183.03ha is under block plantation (Table 4.3, Figure 4.3). Strip and Block plantations contribute 76% and 24% area, respectively. Block plantation is mainly concentrated in north east and central part of the block and strip plantation is scattered throughout the block. Spatial distribution of different type of plantation is depicted in Map

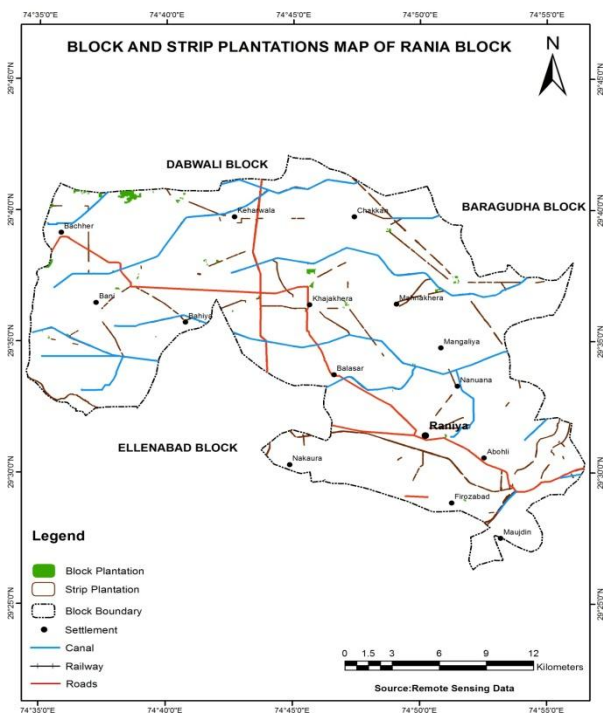
**Table 4.3: Area under Different Categories of Plantation in Rania Block**

Plantation	Area in ha (RS)	% of total plantation
Strip Plantation	581.01	76
Block Plantation	183.03	24
<b>Total Area</b>	<b>764.04</b>	<b>100</b>

**Figure 4.3: Area under Different Categories of Plantation in Rania Block**



**Map 4.3: Block and Strip plantations map of Rania block**



**4.4 Block and Strip Plantations Mapping of Ellenabad Block**

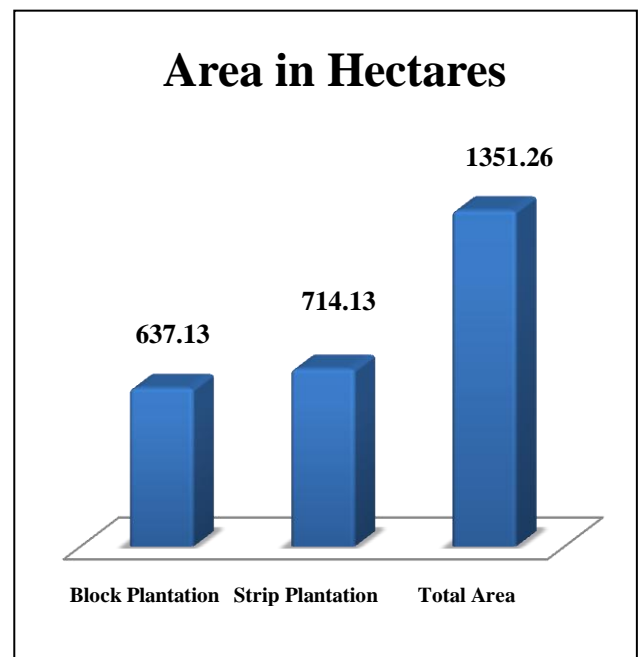
The total geographical area of the blocks is 589.24 sq.km. The Area under plantation is 1351.25ha which is only 2.3 % of the total geographic area. Out of the total plantation

area 714.13 ha is under strip plantation and 637.13ha under block plantation (Table 4.4, Figure 4.4). Strip and Block plantations contribute 53% and 47% area, respectively. Block plantation is mainly concentrated in south west part of the block and strip plantation is concentrated in north east part of the block. Spatial distribution of different type of plantation is depicted in Map 4.4.

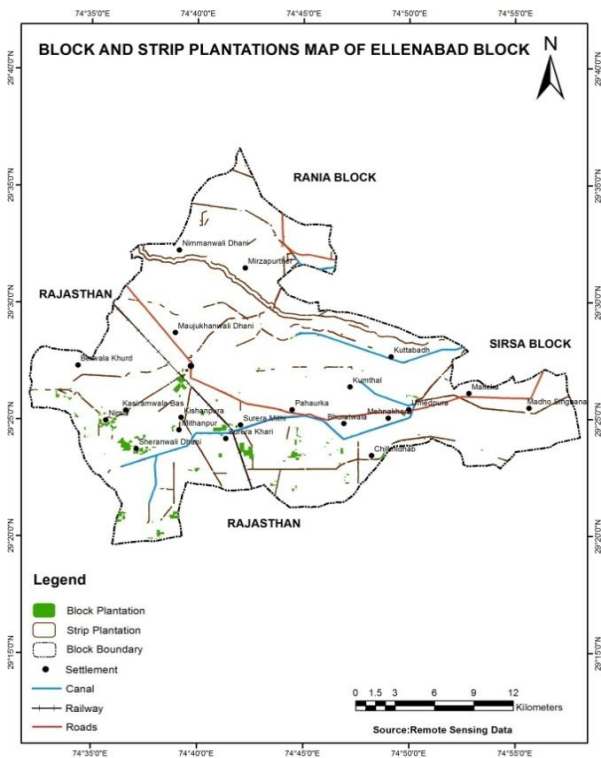
**Table 4.4: Area under Different Categories of Plantation in the Ellenabad Block**

Plantation	Area in ha (RS)	% of total plantations
Strip Plantation	714.13	53
Block Plantation	637.13	47
<b>Total Area</b>	<b>1351.25</b>	<b>100</b>

**Figure 4.4: Area under Different Categories of Plantation in Ellenabad Block**



**Map 4.4: Block and Strip plantations map of Ellenabad Block**



## 5. CONCLUSION

Plantation mapping was done for Dabwali, Rania and Ellenabad development blocks of Sirsa district. Georeferenced World View-2 multispectral data was mosaiced and study area blocks were extracted after overlying administrative boundaries. Multispectral Digital data was displayed and Plantation area was delineated. Onscreen visual interpretation approach was used to identify the plantation in the study area.

1. Plantation mapping was done using World View-2 data applying onscreen visual interpretation approach. Total plantation area derived in the three blocks is 3355.21 hectares.
2. Total Plantation area derived using remote sensing data in the study blocks amounted to 3355.21 ha. Among the total area 2307.13ha.is under strip plantation and 1048.08 ha.is under the block plantation

3. RS data analysis showed that among three blocks of the study area Ellenabad block is having the major plantation area as compared with Dabwali and Rania blocks. This is due to the fact that more plantations are done by the Social Forestry department under Strip Plantation and Community Forestry (Also called as Rural Forestry) scheme in Ellenabad block which is more sandy as compared to other two blocks.
4. Out of total plantation strip and block plantation contributes 68% and 32% area respectively.

## 6. REFERENCE

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