Map View - FI002.0

Last modified by

Pramod Khombare

Current document version

V1.0

Module Name

F-Intel

Contents

1. Document History

VERSION HISTORY							
DATE	**CLIENT NAME**	**VERSION**	**DESCRIPTION OF CHANGE**	**AUTHOR**	**REQUIREMENT ID**	**CCB ID**	**STATUS**
12/08/2024	F-Intel	V 1.0	New Document	Pramod K			Pending

2. Overview -

2.1 Service objectives or Business requirements and the business values added by the service

Use Case: Farm Health Monitoring and Decision Support

The Map View card is a powerful tool designed to help farmers and agronomists gain a comprehensive understanding of the variability within a farm, focusing on key factors such as crop health, canopy greenness, crop nutrition, and moisture stress. Leveraging satellite data, the tool provides a detailed overview by comparing observed values against expected ranges and estimating the percentage of the farm area corresponding to crop health index values, broken down from 0.0 to 1.0.

For other vegetation indices, the Map View card offers a change detection feature, which highlights variations by comparing the mean data of near-time dates with that of the previous date. It also estimates the percentage of the farm area for each index, based on pixel values ranging from 0.0 to 1.0, enabling users to detect significant changes in crop conditions. The comparison tool further allows users to analyze the shift in pixel values over time, providing a clearer picture of crop dynamics.

Additionally, the Map View card includes a time series visualization option for each index, displaying the maximum, mean, and minimum pixel values within the farm from the sowing date to the current date or the anticipated harvest date. This feature helps users track changes in crop conditions throughout the growing season, supporting timely and informed decision-making for farm management.

3. Pre-requisite Services

#	MODULE NAME	SERVICE NAME	SERVICE CODE
1		Satellite data via APIs Name of the provider: Microsoft Planetary Computer	
2		The Data Science team should be granted access to the satellite data and derives indices through APIs to provide the observations.	
3			
4			
5			
6			
7			
8			
9			

4. Add form

4.1

Notes

- Not applicable

Feature:

4.2

Notes

- Not applicable

Field Descriptions

4.4.1. Add form field descriptions

#	FIELD NAME	FIELD DESCRIPTION	ACCEPTANCE DATA/CRITERIA	- ERROR MESSAGE	Sample Example	PREREQUISITE	Mandatory Y/N
			-	-			
			-	-			

5. Customizations Summary Table

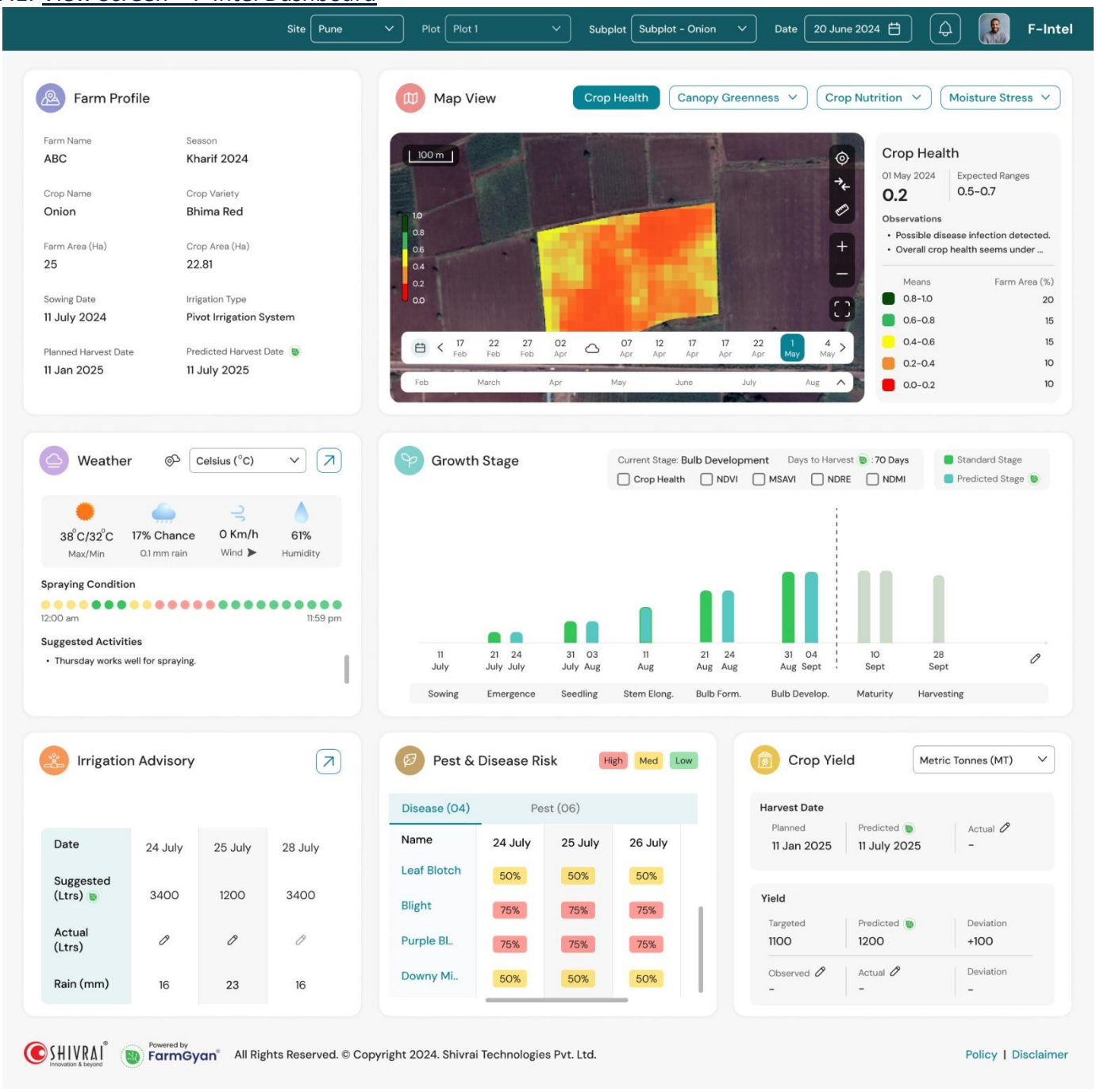
DATE	CLIENT NAME	REQUIREMENT ID	CCB ID	IMPACTED AREA	Change Category	REQUIREMENT STATUS

6. Customization Details/ Use Case

Requirement ID	DevOps ID
Requirement:	

7. View form

7.1. View Screen – F-Intel Dashboard



Notes

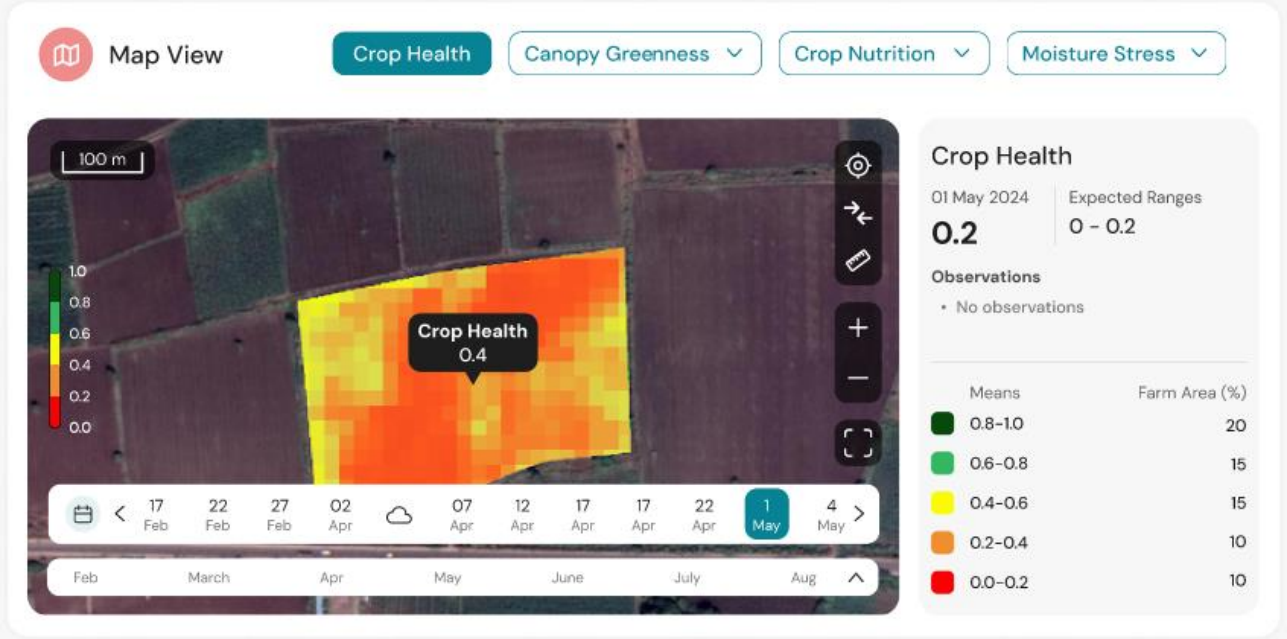
Introducing the F-Intel dashboard, designed to deliver a comprehensive range of insights:

- **Farm Profile**: Provides detailed information about the farm.
- **Map View**: Offers map-based insights into crop health, nutrition, canopy greenness, and moisture stress.
- **Weather Details**: Displays current weather conditions with hourly and daily updates, including suggestions for spraying conditions and recommended activities.

- **Crop Growth Stage**: Tracks the crop's current stage, age, and days to harvest. It also offers insights into crop performance using satellite-based time series data like NDVI, MSAVI, NDRE, and NDMI.
- **Irrigation Advisory**: Recommends the optimal amount of water for irrigation, factoring in actual irrigation and rainwater contribution.
- **Pest and Disease Risk**: Highlights the percentage risk of pests and diseases, complete with images, details, control measures, and expert recommendations.
- **Crop Yield**: Shows planned and predicted harvest dates, allows for input of actual harvest dates, and compares targeted vs. predicted yields. Users can also log field observations during the growing season and actual yields after harvesting to track deviations.

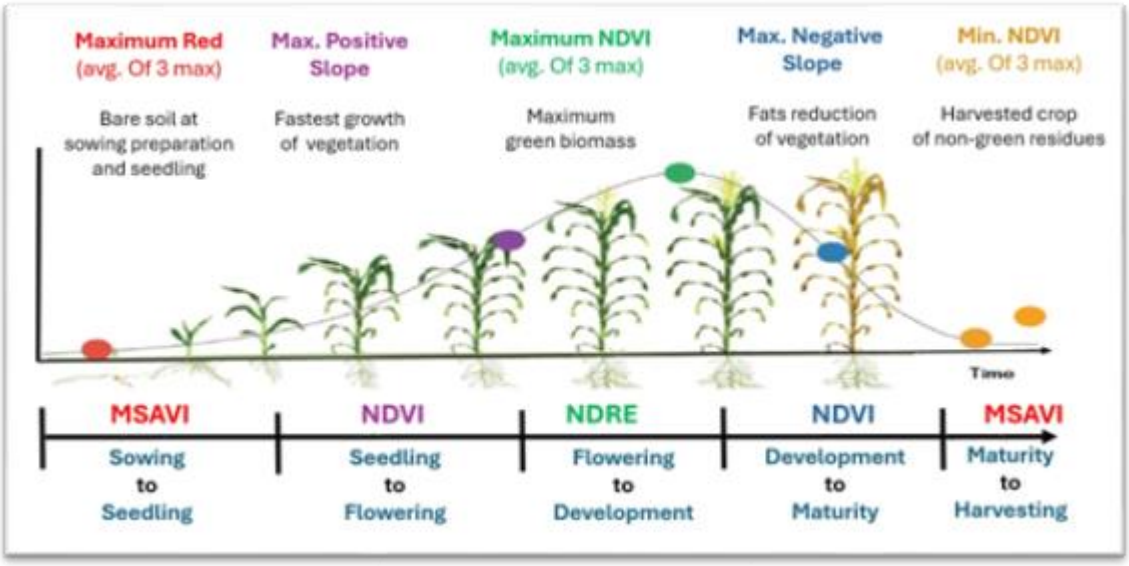
The dashboard presents insights based on the selected site, plot, subplot, and date.

7.2. Feature – Map View - Home Page



Notes

- The Map View card helps you understand the different conditions across a farm by showing key details like crop health, canopy greenness, crop nutrition, and moisture stress using satellite data.
- There is no dropdown menu for the crop health field. The crop health index is a special index developed by Shivrai that combines different indices based on how effective they are at various growth stages, from sowing to harvest.



- The above shared image shows the effectiveness of vegetation indices (MSAVI, NDVI and NDRE) during the crop growth period
- The following are steps to calculate the crop health

1. Selection of Vegetation Indices: Choose relevant vegetation indices: MSAVI, NDVI, NDRE, and NDMI
2. Normalization: Normalize each vegetation index to ensure they are on the same scale, typically between 0 and 1.
3. Weight Calculation: Adjust the weights as per the crop growth stage as shown below.

Growth Stage Range	40% Weightage to Index	30% Weightage to Index	20% Weightage to Index	10% Weightage to Index
Sowing – Seedling Stage	MSAVI	NDVI	NDRE	NDMI
Seedling – Flowering Stage	NDVI	MSAVI	NDRE	NDMI
Flowering - Development Stage	NDRE	NDVI	MSAVI	NDMI
Development - Maturity Stage	NDVI	MSAVI	NDRE	NDMI
Maturity – Harvesting Stage	MASAVI	NDVI	NDRE	NDMI

Important Note

- The respective index weightage is provided to all the pixels of the particular index while calculating “Crop Health”.

- The following is the approach to estimate the Crop Health

Let,

$V_1, V_2, \ldots, V_n$ represent the normalized vegetation indices such as MSAVI, NDVI, NDRE and NDMI

$W_1, W_2 \ldots W_n$ be their corresponding weights.

  - MSAVI (w1): Minimizes soil background effects, useful for early growth stages.
  - NDVI (w2): Sensitive to chlorophyll content, good for overall plant health.
  - NDRE (w3): Sensitive to chlorophyll content in leaves, useful for assessing stress.

- NDMI (w4): Monitors plant water content during critical reproductive and grain-filling stages.

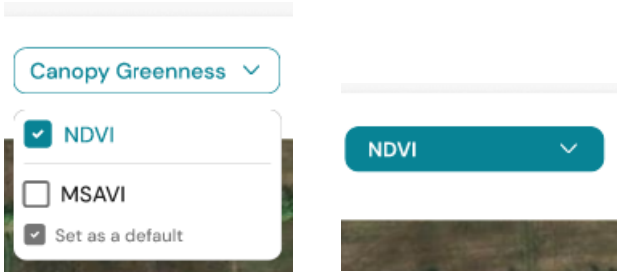
$$Crop\ Health = \sum_{i-1}^{n} Wi\ X\ Vi$$

For example:
Crop Health formula will look like this:

Crop Health= wMSAVI ×MSAVI + wNDVI ×NDVI + wNDRE ×NDRE + wNDMI×NDMI

- Crop Health Index representation details:
  - If the Crop Health pixel values are negative, they should be treated as 0 (absolute)
  - Index Range: 0.0 – 1.0
  - Crop Health Index representation with legend breakup with respective colours
    - 0.0-0.2 - Red-FB0104
    - 0.2-0.4 - Orange-F18E2F
    - 0.4-0.6 - Yellow-FAFB08
    - 0.6 - 0.8 - Green/light green-33B85F
    - 0.8 -1.0 - Dark green -084A0B
- The Maximum Crop Health pixel value represents the highest value among all individual pixels.
- The Minimum Crop Health pixel value represents the lowest value among all individual pixels.
- To calculate the mean of Crop Health, divide the sum of the valid crop health pixel values by the number of valid crop health pixels.

$$\text{Mean} = \frac{Sum\ of\ valid\ crop\ health\ pixel\ values}{Number\ of\ valid\ crop\ health\ pixels}$$



- The canopy greenness field has a dropdown menu that displays two options, NDVI and MSAVI, in black. The user can select one based on their needs and set it as the default to see its variation within the farm. The selected index name will turn blue and appear in the field in white color, as shown in the images above.
- The following is the approach to estimate the MSAVI and NDVI.

MASAVI Formula:

$$MSAVI = \frac{2 \times NIR + 1 - \sqrt{\left((2 \times NIR + 1)^2 - 8 \times (NIR - RED)\right)}}{2}$$

- Bands used: RED (Band 4), NIR (Band 8)
- If the MSAVI pixel values are negative, they should be treated as 0 (absolute)
- MSAVI Index Range: 0.0 – 1.0
- MSAVI representation details:
  - 0.0-0.2 - Red-FB0104
  - 0.2-0.4 - Orange-F18E2F
  - 0.4-0.6 - Yellow-FAFB08
  - 0.6 - 0.8 - Green/light green-33B85F
  - 0.8 -1.0 - Dark green -084A0B
- The Maximum MSAVI pixel value represents the highest value among all individual pixels.
- The Minimum MSAVI pixel value represents the lowest value among all individual pixels.
- To calculate the mean of MSAVI, divide the sum of the valid MSAVI pixel values by the number of valid MSAVI pixels.

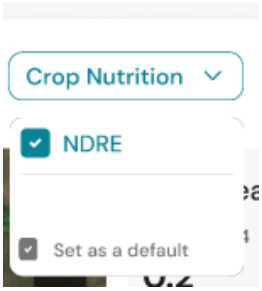
$$\text{Mean} = \frac{Sum\ of\ valid\ MSAVI\ pixel\ values}{Number\ of\ valid\ MSAVI\ pixels}$$

NDVI Formula:

$$NDVI = \frac{(NIR - RED)}{(NIR + RED)}$$

- Bands used: RED (Band 4), NIR (Band 8)
- If the NDVI pixel values are negative, they should be treated as 0 (absolute)
- NDVI Index Range: 0.0 – 1.0
- NDVI representation details:
  - 0.0-0.2 - Red-FB0104
  - 0.2-0.4 - Orange-F18E2F
  - 0.4-0.6 - Yellow-FAFB08
  - 0.6 - 0.8 - Green/light green-33B85F
  - 0.8 -1.0 - Dark green -084A0B
- The Maximum NDVI pixel value represents the highest value among all individual pixels.
- The Minimum NDVI pixel value represents the lowest value among all individual pixels.
- To calculate the mean of NDVI, divide the sum of the valid NDVI pixel values by the number of valid NDVI pixels.

$$\text{Mean} = \frac{Sum\ of\ valid\ NDVI\ pixel\ values}{Number\ of\ valid\ NDVI\ pixels}$$



- The crop nutrition field has a dropdown menu that displays one option, NDREI, in black. The user can select one based on their needs and set it as the default to see its variation within the farm. The selected index name will turn blue and appear in the field in white color, as shown in the images above (canopy greenness) and above.
- The following is the approach to estimate the NDRE.

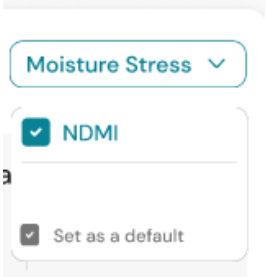
  NDRE Formula:

$$NDRE = \frac{(NIR - RedEdge)}{(NIR + RedEdge)}$$

  - Bands used: RE (Band 5), NIR (Band 8)
  - If the NDRE pixel values are negative, they should be treated as 0 (absolute)
  - NDRE Index Range: 0.0 – 1.0
  - NDRE representation details:
    - 0.0-0.2 - Red-FB0104
    - 0.2-0.4 - Orange-F18E2F
    - 0.4-0.6 - Yellow-FAFB08
    - 0.6 - 0.8 - Green/light green-33B85F
    - 0.8 -1.0 - Dark green -084A0B
  - The Maximum NDRE pixel value represents the highest value among all individual pixels.
  - The Minimum NDRE pixel value represents the lowest value among all individual pixels.
  - To calculate the mean of NDRE, divide the sum of the valid NDRE pixel values by the number of valid NDRE pixels.

$$\text{Mean} = \frac{Sum\ of\ valid\ NDRE\ pixel\ values}{Number\ of\ valid\ NDRE\ pixels}$$

  -



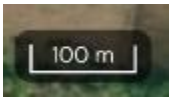
- The moisture index field has a dropdown menu that displays one option, NDMI, in black. The user can select one based on their needs and set it as the default to see its variation within the farm. The selected index name will turn blue and appear in the field in white color, as shown in the images above (canopy greenness) and above.
- The following is the approach to estimate the NDMI.

  NDMI Formula:

$$NDMI = \frac{(NIR - SWIR)}{(NIR + SWIR)}$$

  - Bands used: NIR (Band 8a), SWIR1 (Band 11)
  - If the NDMI pixel values are negative, they should be treated as 0 (absolute)
  - NDMI Index Range: 0.0 – 1.0
  - NDMI representation details:
    - 0.0-0.2 - Red-D81820
    - 0.2-0.4 - Orange-F19252
    - 0.4-0.6 - Yellow-FDDF29
    - 0.6 - 0.8 - Green-01E93B
    - 0.8 -1.0 - Blue-0D99EC
  - The Maximum NDMI pixel value represents the highest value among all individual pixels.
  - The Minimum NDMI pixel value represents the lowest value among all individual pixels.
  - To calculate the mean of NDMI, divide the sum of the valid NDMI pixel values by the number of valid NDMI pixels.

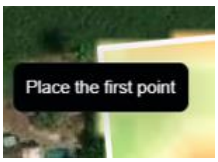
$$\text{Mean} = \frac{Sum\ of\ valid\ NDMI\ pixel\ values}{Number\ of\ valid\ NDMI\ pixels}$$

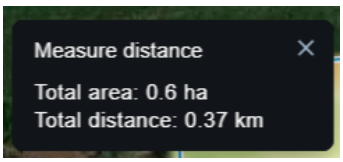


- The icon in the above image represents the “Resolution Bar” feature, which is often used in digital maps like Google Maps or satellite images. This tool provides a reference for the map's current zoom level by showing the distance represented by a specific segment of the map.

- The icon in the above image represents the 'Find Field' feature, commonly used in Agritech platforms with satellite-based crop monitoring solutions. This tool allows users to quickly locate and zoom in on a specific field on the map after selecting it.

- The icon in the above image represents the 'Compare' feature, often found in Agritech platforms with satellite-based crop monitoring solutions. After clicking on this icon, the screen will be split into two equal parts. And it enables the user to compare the same or different vegetation indices for a selected field across various dates. It provides valuable insights into the changes in crop conditions over time, helping to identify issues and plan field activities more effectively.

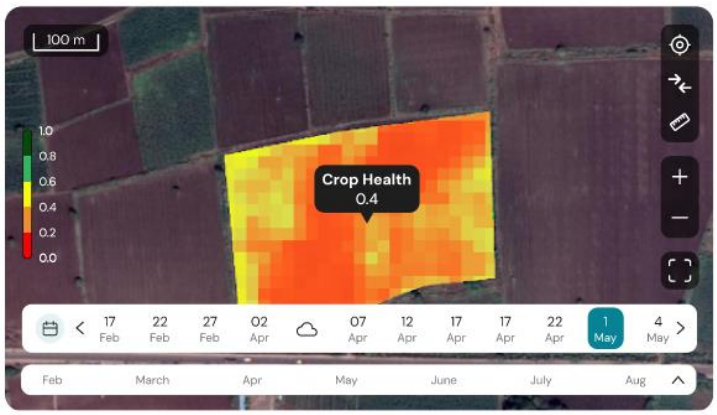




- The icon in the above image represents the 'Measure Distance' feature, commonly used in digital maps like Google Maps or satellite images. This tool allows users to calculate the total area of a field or measure distances between objects. Simply outline the field or select the points of measurement to see the results displayed on the screen.

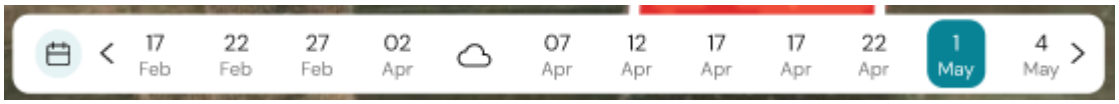
- The icons in the above image represent the 'Zoom In/Out' feature, commonly used in digital maps like Google Maps or satellite images. This tool allows users to zoom in ("+") and out ("-") on a specific field on the map for easier navigation. The same functionality is allowed by using a mouse wheel.

- The icon in the above image represents the 'Full Screen' feature, commonly used in digital maps like Google Maps or satellite images. This tool allows user to view an index map(s) in full screen mode, covering the entire device screen.

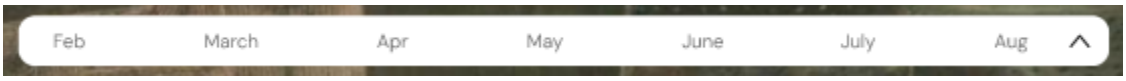


- When user hover the cursor over any point within the field, the values of the selected indices for that point will be displayed on the index map as a tooltip as shown in above image.

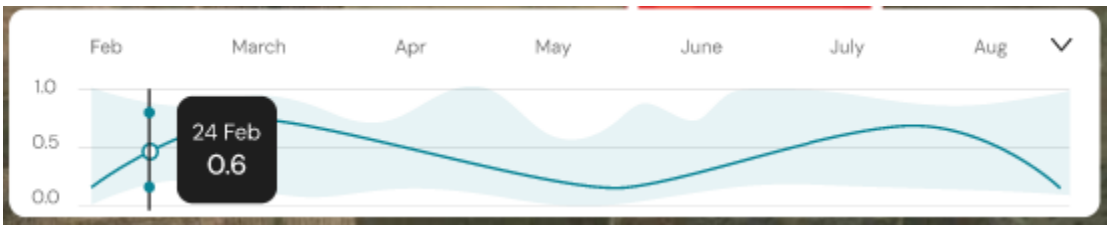
- The image above depicts a color-coded ‘Legend’ ranging from 0 to 1, divided into five equal intervals of 0.2. Each interval is represented by a distinct color, enabling users to easily interpret vegetation indices and density in satellite imagery.



- The image above features a 'Date Bar' that extends from the sowing date to the most recent available vegetation index image date (highlighted in blue). Only the dates with available vegetation index data are shown on the Date Bar, while a cloud icon marks dates when the index is unavailable due to cloud cover. Users can scroll horizontally to select and view vegetation indices between the sowing date and the latest available date, or they can click on the calendar icon and choose a specific date using the calendar. All the information in the change detection section will change with respect to the date chosen by the user.



- The image above features a 'Time Series Graph' that extends from the sowing date to the most recent available vegetation index image date. On x-axis of ‘Time Series Graph’ names of months are mentioned and they extend from the sowing date to the most recent available vegetation index image date. The ‘Time Series Graph’ has an ‘Chevron Up’ icon to expand the Graph as shown in image below.

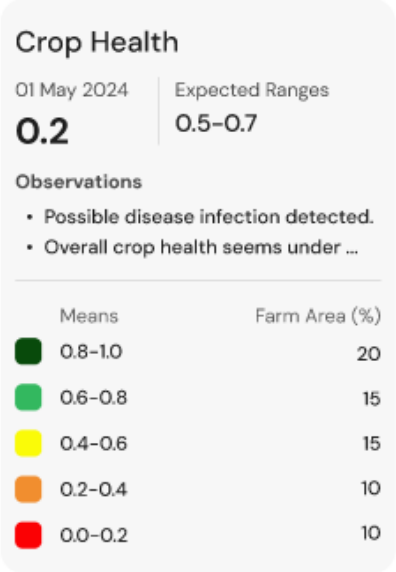


- The above image presents an expanded "Time Series Graph" that spans from the sowing date to the latest available vegetation index image date.
- The x-axis of the graph displays the months, extending from the sowing date to the most recent available vegetation index image date.

- The y-axis features an index legend ranging from 0 to 1, divided into two intervals of 0.5.
- The graph plots time series mean, maximum and minimum pixel value of the selected vegetation index from the sowing date to the most recent available date.
- Circles on the graph represent the mean pixel value of the selected index on a given date, with a vertical line indicating the highest and lowest pixel values within the farm on that date. Hovering over these circles reveals a tooltip with these details.
    - The Maximum pixel value represents the highest value among all individual pixels.
    - The Minimum pixel value represents the lowest value among all individual pixels.
    - To calculate the mean, divide the sum of the valid pixel values by the number of valid pixels.

$$\text{Mean} = \frac{Sum\ of\ valid\ pixel\ values}{Number\ of\ valid\ pixels}$$

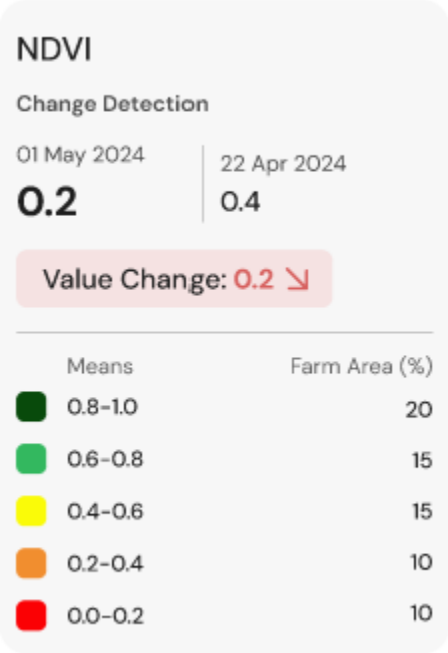
- A sky-blue buffer is shown on the graph, reflecting the range between the highest and lowest pixel values across all dates.
- The "Time Series Graph" includes a "Chevron Down" icon to allow users to collapse the graph.



- The change detection section is highlighted in grey, as shown in the above image.
- The title (e.g., "Crop Health") is dynamic and changes according to the selected vegetation index.
- If the user selects the Crop Health index, the following details are displayed:
    - The date (e.g., "01 July 2024") is also dynamic and updates based on the latest available crop health index image date.
    - The mean pixel value (e.g., "0.2") is dynamic, adjusting to the latest crop health index image date. It is displayed in bold and larger font.
        - To calculate the mean, divide the sum of the valid pixel values by the number of valid pixels.

$$\text{Mean} = \frac{Sum\ of\ valid\ pixel\ values}{Number\ of\ valid\ pixels}$$

- The expected ranges (e.g., "0.5 – 0.7") change based on the crop growth stage.
- Observations are listed in bullet points after comparing the latest crop health mean value with the expected ranges.
- The means (i.e. pixel values) are represented by a color-coded legend ranging from 0 to 1, divided into five intervals of 0.2. Each colour represents a different range, and the corresponding farm area coverage percentage is calculated and displayed. These values change based on the latest vegetation index image date.

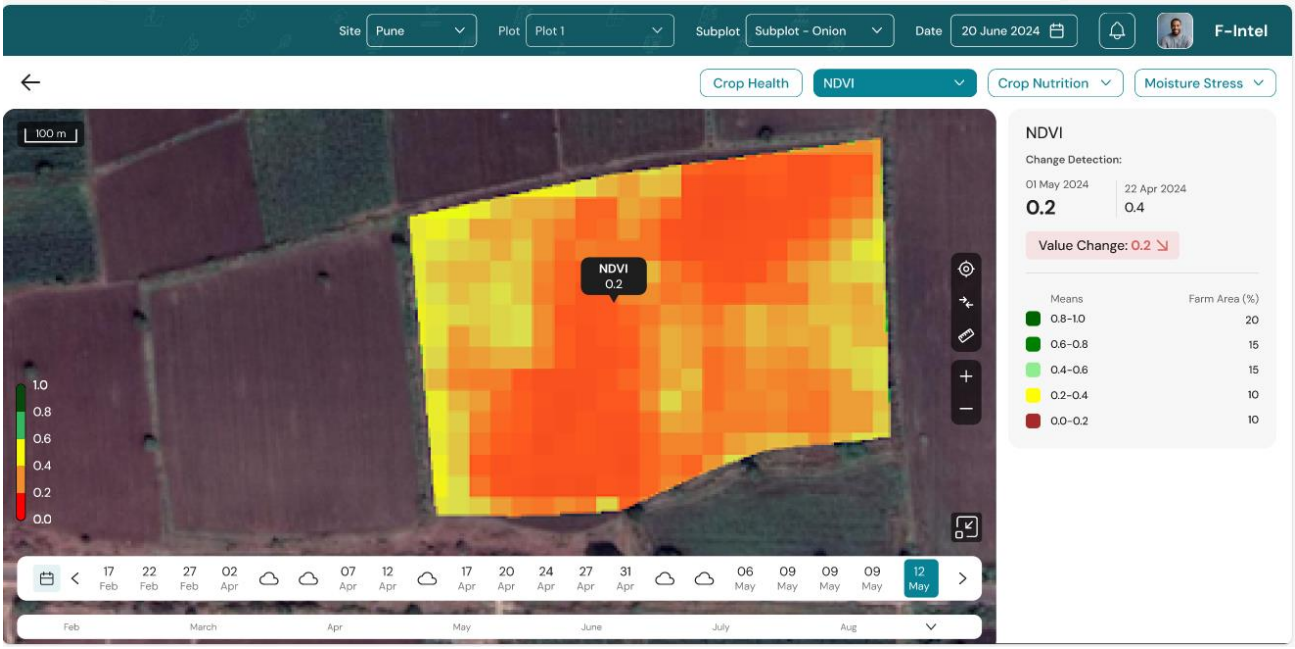


- The change detection section is highlighted in grey, as shown in the above image.
- The title (e.g., "NDVI") is dynamic and changes according to the selected vegetation index. The details mentioned here are also applicable for the MSAVI, NDRE, and NDMI indices when they are selected.
- If the user selects the NDVI index, the following details are displayed:
  - "Change Detection" is a fixed label for all vegetation indices except "Crop Health."
  - The first date (e.g., "01 July 2024") is a dynamic label that updates to the latest available vegetation index image date.
  - The second date (e.g., "22 April 2024") is also a dynamic label that shows the immediately previously available date of the vegetation index image.
  - "Value Change" is a fixed label written in black colour, and the change in value is displayed by comparing the latest mean value with the previous date mean value. If the value has increased (positive change), it is shown with an upward arrow on a green background and the change in value is written in green colour; if it has decreased

(negative change), it is shown with a downward arrow on a red background and change in value is written in red colour. If there is no change in value, it is shown without an arrow without a background and the change in value is written in black colour.

- The means (i.e. pixel values) are represented by a color-coded legend ranging from 0 to 1, divided into five intervals of 0.2. Each colour represents a different range, and the corresponding farm area coverage percentage is calculated and displayed. These values change based on the latest vegetation index image date.

7.2.1. Feature – Map View - Expanded Page



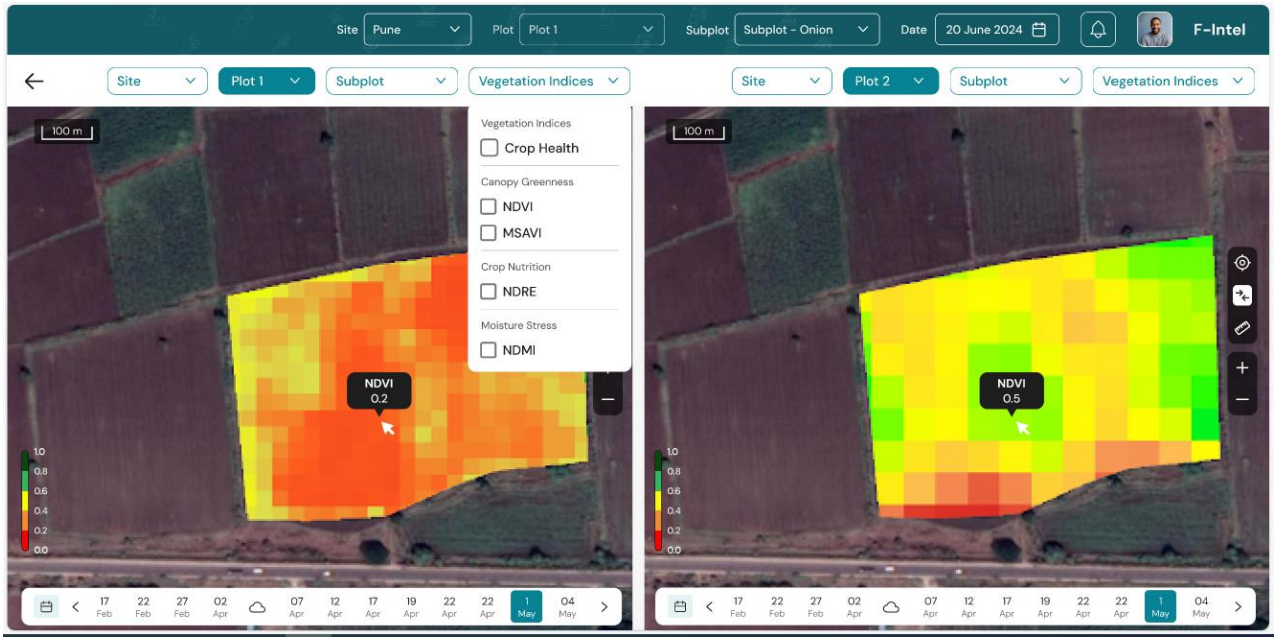
Notes

- All fields, icons, index legends, date bar, time series bar, change detection section, and other features function as described above.
- In the change detection section, vertical scrolling is enabled to view additional points in the observations if necessary.

- The icon in the above image represents the "Exit Full Screen" feature, commonly used in digital maps like Google Maps or satellite images, which allows the user to exit full-screen mode.

- To return to home page, click the corresponding icon (i.e. Exit Full Screen) or the back icon (shown in the above image).

7.2.2. Feature – Map View -Compare Page

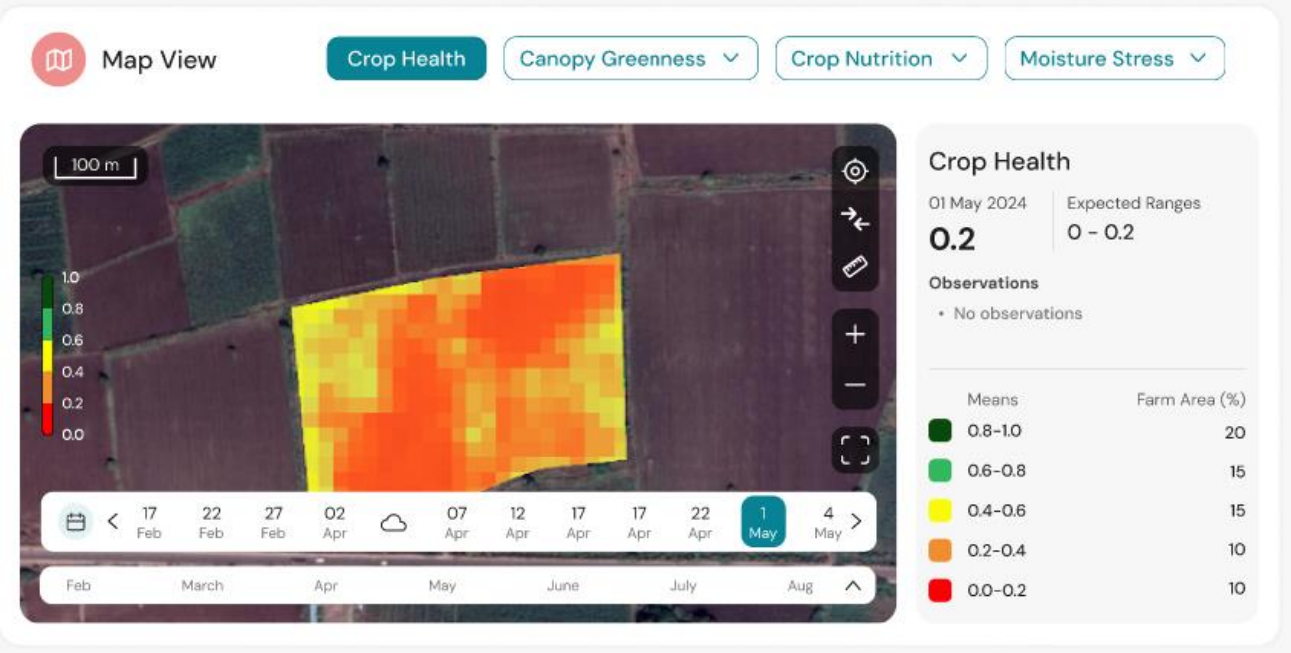


Notes

- The compare page is divided into two equal sections, allowing users to compare the same or different vegetation indices for a selected field across various dates. This feature provides valuable insights into crop condition changes over time, helping users identify issues and plan field activities more effectively.
- The ‘Site’ field includes a dropdown list with site names. Users can select a site to choose a plot associated with it, which will be displayed in the field once selected.
- The ‘Plot’ field contains a dropdown list with plot names. Users can select a plot to choose a subplot linked to it, and the plot name will be shown in the field after selection.
- The ‘Subplot’ field features a dropdown list with subplot names. Users can select a subplot to visualize and compare the same or different vegetation indices, with the subplot name displayed in the field after selection.
- The ‘Vegetation Indices’ field has a dropdown menu showing available indices and their categories. Users can choose an index to visualize and compare the same or different vegetation indices.
- The date bar, extending from the sowing date to the most recent available vegetation index image date (highlighted in blue), allows users to select the desired date for comparison.
- When users hover over any point within the field, the values of the selected indices for that point will be displayed on the map simultaneously on both screens (refer to the image for details). This feature enables users to compare index values for the same point within the field but on different dates.
- Users can also select and compare different indices in each viewer.
- All remaining icons and features function as previously described.

- To return to single view mode, click the corresponding icon (i.e., Compare) or the back icon (shown in the above image).

7.2.3. Feature – Map View -Home Page – No Observations



Notes

- When there are no observations to suggest to a user then “No observation” has to be displayed in that section.

7.3. Cancel & Close Functionality

Notes

- Not applicable

7.4. Reverse Functionality

Notes

- Not applicable

7.5. Field Descriptions – Map View – Home Page

#	FIELD NAME	FIELD DESCRIPTION	ACCEPTANCE DATA/CRITERIA	ERROR MESSAGE	PREREQUISITE	Enabled/Disabled
1	Crop Health	This will show the crop health index when clicked on it	- This is a field with click action - When clicked on Crop Health then crop health index is shown	NA	The Crop Health details have been explained in section 7.2	NA
2	Canopy Greenness	This will show the dropdown list of canopy greenness indices when clicked on it	- This is a field with click action - When clicked on it a dropdown list that NDVI and MSAVI shows up	NA	NA	NA
3	NDVI	This will show the NDVI index when clicked on it	- This is a checkbox label - User has to click on it to view NDVI index and its value	NA	The NDVI details have been explained in section 7.2	NA

			- You can also make it the default by checking the box			
4	MSAVI	This will show the NDVI index when clicked on it	- This is a checkbox label - User has to click on it to view MSAVI index and its value - You can also make it the default by checking the box	NA	The MSAVI details have been explained in section 7.2	NA
5	Set as Default	This will set the particular index as default when clicked on it	- This is a checkbox label - User has to click on it to set the particular index as default	NA	NA	NA
6	Crop Nutrition	This will show the dropdown list of crop nutrition indices when clicked on it	- This is a field with click action - When clicked on it a dropdown list that NDRE shows up	NA	NA	NA
7	NDRE	This will show the NDRE index when clicked on it	- This is a checkbox label - User has to click on it to view NDRE index and its value - You can also make it the default by checking the box	NA	The NDRE details have been explained in section 7.2	NA
8	Moisture Stress	This will show the dropdown list of moisture stress indices when clicked on it	- This is a field with click action - When clicked on it a dropdown list that NDMI shows up	NA	NA	NA
9	NDMI	This will show the NDMI index when clicked on it	- This is a checkbox label - User has to click on it to view NDMII index and its value - You can also make it the default by checking the box	NA	The NDMI details have been explained in section 7.2	NA
10	Resolutions Bar	This provides a reference for the map's current zoom level by showing the distance represented by a specific segment of the map	- This is a tool - It helps user to see current zoom level by showing the distance	NA	NA	NA
11	Find Field	This feature helps user quickly find and zoom in on a specific field on the map	- This is a tool - It helps user quickly find and zoom in on a specific field on the map	NA	NA	NA
12	Compare	After clicking on this tool, the screen will be split into two equal parts. And it enables the user to compare the same or different vegetation indices for a selected field across various dates	- This is a tool - After clicking on this tool, the screen will be split into two equal parts. And it enables the user to compare the same or different vegetation indices for a selected	NA	NA	NA

			field across various dates			
13	Measure Distance	This tool allows users to calculate the total area of a field or measure distances between objects	- This is a tool - It helps users to calculate the total area of a field or measure distances between objects	NA	NA	NA
14	Zoom In	This tool allows users to zoom in (“+”) on a specific field on the map for easier navigation.	- This is a tool - This tool allows users to zoom in (“+”) on a specific field on the map for easier navigation. - The same functionality is allowed by using a mouse wheel.	NA	NA	NA
15	Zoom Out	This tool allows users to zoom out (“-”) on a specific field on the map for easier navigation.	- This is a tool - This tool allows users to zoom out (“-”) on a specific field on the map for easier navigation. - The same functionality is allowed by using a mouse wheel.	NA	NA	NA
16	Full Screen	This tool allows user to view map layer in full screen mode, covering the entire device screen.	- This is a tool - This helps user to view map layer in full screen mode	NA	NA	NA
17	Index Pixel Value Tooltip	This shows the value of mouse hovered pixel value in a tooltip	- This is a tool - This shows the pixel value of particular index in a tooltip	NA	NA	NA
18	Legend	It’s a color-coded legend which ranges from 0 to 1, divided into five equal intervals of 0.2. Each interval is represented by a distinct color, enabling users to easily interpret vegetation indices	- This is a legend - Legend helps user to easily interpret vegetation indices	NA	NA	NA
19	Date Bar	This show the date that is extending from the sowing date to the most recent available vegetation index date	- This is a date bar - This shows the dates for which vegetation index are available - Cloud icon on the date bar marks the dates when the index is unavailable due to cloud cover - User can click on the Date Bar and choose a specific date from the calendar	NA	NA	NA
20	Time Series Graph	This shows the particular vegetation	- This is expandable and collapsible graph	NA	NA	NA

		index's mean, max and min pixel values. The dates extend from the sowing date to the most recent available vegetation index image date	- This shows the particular vegetation index's mean, max and min pixel values of the available vegetation index date - The dates extend from the sowing date to the most recent available vegetation index image date			
21	Chevron Up	This expands the Time Series Graph vertically	- This is an icon with click action - This expands the Time Series Graph vertically after clicked on it	NA	NA	NA
22	Chevron Down	This collapses the Time Series Graph vertically	- This is an icon with click action - This collapses the Time Series Graph vertically after clicked on it	NA	NA	NA
23	X-axis of Time Series Graph	This shows names of months, extending from the sowing date to the most recent available vegetation index image date.	- This is label - This shows names of months, extending from the sowing date to the most recent available vegetation index image date.	NA	NA	NA
24	Y-axis of Time Series Graph	This shows the index legend ranging from 0 to 1, divided into two intervals of 0.5	- This is a label - This shows the index legend ranging from 0 to 1, divided into two intervals of 0.5	NA	NA	NA
25	Circle(s)	This will show mean pixel value of the selected index on a given date	- This is an icon - Circles on the time series data indicate the dates when a particular index is available - When mouse hovered on it a tooltip shows the index mean value along with highest and lowest pixel values within the entire crop area on that date.			
26	Sky-blue buffer	A sky-blue buffer is shown the range between the highest and lowest pixel values across all dates.	- This is a buffer - It connects all the highest values on the upper side and all the lowest values on the lower side and shows as a buffer			
27	Crop Health change detection section	This shows the analysis of the particular index in this section	- This is a section - This shows the analysis of the particular index in this section	NA	NA	NA
28	Crop Health	This is a dynamic title which changes according to the selected vegetation index	- This is dynamic title - This is a dynamic title which changes according to the	NA	NA	NA

			selected vegetation index			
29	01 May 2024	This is date and it is dynamic as it changes with respect to the date of latest available vegetation index	- This is date label - This is dynamic and updates based on the latest available crop health index image date. - Under this date it shows the mean pixel value of the crop area and its dynamic	NA	NA	NA
30	Expected Ranges	This shows the expected ranges that change based on the crop growth stage	- This is label - Under this label it shows expected ranges that change based on the crop growth stage - This ranges will be provided by the Farmgyan API	NA	API Name: API Code:	NA
31	Observations	This shows the observations on crop health	- This is label - Under this label it shows the observations based on the crop health and growth stage - This ranges will be provided by the Farmgyan API	NA	API Name: API Code:	NA
32	Means or Pixel Value Ranges	This shows the color-coded means or pixel value ranges of a particular vegetation index	- This is label - This shows the color-coded means or pixel value ranges of a particular vegetation index - Each colour represents a different range, and the corresponding farm area coverage percentage is calculated and displayed. - The Farm Area (%) values change based on the latest vegetation index image date	NA	NA	NA
33	Farm Area (%)	This shows values that is calculated on how much area each color pixel is covering the farm area by a particular vegetation index	- This is label - This shows values that is calculated on how much area each color pixel is covering the farm area by a particular vegetation index - The Farm Area (%) values change based on the latest vegetation index image date	NA	NA	NA
34	NDVI or other indices change	This is a dynamic title which changes according to the	- This is dynamic title	NA	NA	NA

	detection section	selected vegetation index	- This changes according to the selected vegetation index			
35	Change Detection	This acts like a header	- This is a header - This is static for all the vegetation indices except crop health	NA	NA	NA
36	01 May 2024	This is date and it is dynamic as it changes with respect to the date of latest available vegetation index	- This is date label - This is dynamic and updates based on the latest available vegetation index image date. - Under this date it shows the mean pixel value of the selected vegetation index over the crop area and its dynamic	NA	NA	NA
37	22 Apr 2024	This is date and it is dynamic as it changes with respect to the date of immediately previously available vegetation index date	- This is date label - This is dynamic and updates based on the immediately previously available vegetation index image date. - Under this date it shows the mean pixel value of the selected vegetation index over the crop area and its dynamic	NA	NA	NA
38	Value Change	Value Change" is a fixed label, and the change in value is displayed by comparing the latest value with the previous one. If the value has increased (positive change), it is shown with an upward arrow on a green background; if it has decreased (negative change), it is shown with a downward arrow on a red background.	- This is label - This shows the change in value by comparing the latest value with the previous one - If the change in value is positive then it is shown with an upward arrow on a green background - If the change in value is negative then it is shown with an downward arrow on a red background	NA	NA	NA

Notes

7.6. Field Descriptions – Map View – Expanded Page

#	FIELD NAME	FIELD DESCRIPTION	ACCEPTANCE DATA/CRITERIA	ERROR MESSAGE	PREREQUISITE	Enabled/Disabled
1	Back Icon	This will help the user to return to previous or home page	- This is icon with click action - When user click on it, it will take him to home or previous page	NA	NA	NA

2	Exit Full Screen	This tool allows user to exit full screen map layer and take user to home page	- This is a tool - This helps user to exit full screen mode of map layer	NA	NA	NA
3	Vertical Scroll	This helps user to view more observation if any	- This is scroll - User can scroll vertically to view more observation to read to make informed decisions	NA	NA	NA
4	Other Icons & Features	All other icons, tools and fields works similar as explained earlier	NA	NA	NA	NA

7.7. Field Descriptions – Map View – Compare Page

#	FIELD NAME	FIELD DESCRIPTION	ACCEPTANCE DATA/CRITERIA	ERROR MESSAGE	PREREQUISITE	Enabled/Disabled
1	Site	This will show the list of site names in the dropdown	- This is a field - It helps user to select the particular site from the dropdown when clicked on it - By default, user can select only one subplot in one time	NA	NA	NA
2	Plot	This will show the list of plot names in the dropdown	- This is a field - It helps user to select the particular plot from the dropdown when clicked on it - By default, user can select only one subplot in one time	NA	NA	NA
3	Subplot	This will show the list of subplot names in the dropdown	- This is a field - It helps user to select the particular subplot from the dropdown when clicked on it - By default, user can select only one subplot in one time	NA	NA	NA
4	Vegetation Indices	This will show the list of vegetation indices names in the dropdown	- This is a field - It helps user to select the particular vegetation index from the dropdown when clicked on it - By default, user can select only one vegetation index in one time	NA	NA	NA
5	Index Pixel Value Tooltip	This shows the particular pixel value in a tooltip after mouse hover	- This is a tool - When users hover over any point within the field, the values of the selected indices for that point will be displayed in the tooltip	NA	NA	NA

			simultaneously on both screens (refer to the image shown in section 7.2.2.for details). - This tooltip enables users to compare index values for the same point within the field but on different dates			
6	Back Icon	This will help the user to return to previous or home page	- This is icon with click action - When user click on it, it will take him to home or previous page	NA	NA	NA
7	Compare	This will help the user to exit the compare page and return to home page	- This is icon with click action - When user click on it, it will take him to home page	NA	NA	NA
8	Other Icons & Features	All other icons, tools and fields works similar as explained earlier	NA	NA	NA	NA

7.8. Field Descriptions – Map View – Home Page – No Observations

#	FIELD NAME	FIELD DESCRIPTION	ACCEPTANCE DATA/CRITERIA	ERROR MESSAGE	PREREQUISITE	Enabled/Disabled
1	Observations	When there are no observations to suggest to a user then “No observation” has to be shown in that section	- This is label - Under this label it shows the no observations if there nothing to show	NA	NA	NA

7.9. Scenarios

#	SCENERIO NAME	SCENERIO DESCRIPTION & IMPACT
1	When observations not available	When there are no observations to suggest to a user then “No observation” has to be shown in that section as shown in section 7.2.3

Notes

8. Common Validations

Add Form

#	FIELD NAME	FIELD DESCRIPTION	Applicable Y/N

View Form

#	FIELD NAME	FIELD DESCRIPTION	Applicable Y/N

1			
2			

9. Edit Functionality

Notes

- Not applicable

10. Account Postings

Ledger details	Explanation	Ledger Name	Dr	Cr	Dr	Cr

Notes

- Not applicable

11. Detailed View

Notes

- Not applicable

12. Print View

Notes

- Not applicable

13. Configuration Settings

#	CONFIG SETTING ID	CONFIG SETTING NAME	CONFIG SETTING IMPACT DETAILS

14. Post-Impacted Services & Reports

#	MODULE NAME	SERVICE NAME	SERVICE CODE	DESCRIPTION / IMPACT

Notes

- Not applicable

15. Email Alerts

Notes

- Not applicable