Welcome to YieldLens: Field Variability & Management Zone Analyzer

YieldLens is a free, interactive, and user-friendly Google Earth Engine application developed by the UC ANR Intermountain Research & Extension Center. Designed to provide California growers with rapid insights, the tool leverages vegetation indices from both recent and archived satellite imagery to evaluate crop health and field variability. Whether you are optimizing inputs, directing crop scouting, or seeking a comprehensive view of your operation, YieldLens transforms complex multispectral data into practical, actionable maps and reports.

- How Can You Use YieldLens?

- **Targeted Crop Scouting:** Identify underperforming zones from your computer, tablet, or smartphone before heading to the field. Pinpointing problem areas in advance saves time and labor by focusing your efforts where they are needed most.
- **Create Management Zones:** Automatically delineate your field into practical "management zones" based on crop vigor. Download these zones as .kml files to guide precision soil sampling or to perform variable-rate fertilizer applications.
- **Monitor Growth Over Time:** Track crop performance throughout the growing season. Use historical time-series charts to compare current growth against previous weeks or past seasons.
- **Generate Instant Reports:** Instantly create a summary of your field's health and variability status to share with your crew.

- What Are Vegetation Indices?

Satellite sensors "see" wavelengths of light invisible to the human eye, specifically Near-Infrared (NIR). Healthy plants absorb most visible light for photosynthesis while reflecting high levels of NIR. In contrast, stressed plants reflect more visible light and less NIR. A Vegetation Index is a mathematical formula that compares these reflectance behaviors to provide a single, mapped score of canopy health. By analyzing these maps, you can identify underperforming areas caused by clogged sprinklers, irrigation leaks, nutrient deficiencies, pest pressure, or others.

- Which Index Should You Use?

YieldLens provides three indices optimized for specific crop stages and management needs:

- **NDVI (Normalized Difference Vegetation Index):** Uses Red and Near-Infrared light to measure overall vigor. **Best for** monitoring early to mid-season growth. **Note:** Can "saturate" in dense crops like alfalfa prior to harvest, hiding subtle health differences.
- **GNDVI (Green Normalized Difference Vegetation Index):** Substitutes Green light for Red light in the NDVI formula. **Best for** assessing nitrogen status and water stress during the peak growing season. Because it is more sensitive to chlorophyll concentrations than NDVI, it is a better tool for nutrient management.
- **NDRE (Normalized Difference Red Edge):** Utilizes the "Red Edge" band—a narrow region of light that penetrates deeper into the plant canopy than standard red light. **Best Use:** High-biomass, late-season crops. NDRE is a better choice when NDVI saturates.

Step-by-Step Guide: How to Use the YieldLens Tool

Step 1: Access the Tool:

Click the **[YieldLens]** or scan the QR code.
Tip: Use Landscape Mode on mobile devices for a better viewing experience.

Step 2: Define Your Field Boundary

You must tell the app which field to look at.

First, zoom to the field of interest area then you have two options:

Select CA Field: Click this button if you are analyzing a pre-defined field in California. Yellow outlines will appear on the map. Click inside a yellow boundary to select it. The tool will automatically drop the outer 30 feet to avoid analyzing roads, or mixed edge pixels.

Draw Custom Field: Click this button to manually draw a polygon around your field. Click around the perimeter of your field and click the starting point to close the shape. **Tip:** For the most accurate data, ensure your boundary stays within the field edges and avoids roads, barns, or non-crop areas.

Clear Map & Reset: Use this button at any time to erase your selection, clear the map, and start over.

Note on Limits: The analysis is restricted to California fields smaller than 500 acres.

Step 3: Select Your Analysis Target Date:

Enter your target date of interest (YYYY-MM-DD). The tool automatically finds the clearest image within a 3-day window. If it's cloudy, shift the date by 3 days.

Step 4: Choose a Vegetation Index

Click an index button to generate your map:

- **NDVI:** General vigor and early season growth.
- **GNDVI:** Water and nitrogen stress.
- **NDRE:** Dense crops and late-season growth.
- **RGB:** Generates a "True Color" satellite image (how it looks to the human eye). Note: The RGB image will show a larger satellite image, not just your clipped field.

Step 5: Create Management Zones:

Click **"Zones and Analysis"** to automatically categorize your field into zones (from low “light green” to high vigor “dark green”) and calculate the exact acreage and percentage for each zone. After running the "Zones and Analysis" tool, a blue hyperlink will appear. Click "Download Zones (KML)" to export these shapes for use in tractor GPS displays or mobile mapping apps.

Step 6: Track Performance Over Time:

To see how your crop has progressed over a season. Enter a start/end date and click **"Run Time Series"** to chart the average value of your currently selected index (NDVI, GNDVI, or NDRE) over that time period.

Step 7: Export Your Findings:

Click **"Generate PDF Report"** for a printable summary.

Tip: Save the file by using **Ctrl/Cmd + P** and selecting **"Save as PDF."**

Step 8: Historical Crop Type:

Click the **“Get Crop History”** button at the very bottom of the panel to see what has been planted in this field in the past. The tool queries the USDA NASS Cropland Data Layer and a table will populate showing the crop grown in that field for every year since 2010.

We Want Your Feedback!

YieldLens is built for growers, and your real-world experience is essential to its improvement. As you use the tool this season, please share your insights, comments, suggestions, or bug reports to Ahmed Kayad at agkayad@ucanr.edu