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Global Weed Management Platform for Field Trials

Project Goal

Weed on open fields is harming farmers by suppressing growth of the planted crops. Applying agronomic practices along with chemical herbicides can limit the damage from weeds. Global field trial experiments are carried out to gain insights about effectiveness and good combinations of agronomic practices while taking regional differences into account. The common practice of field trials is to create a wide range of manual assessment data about weed counts, product efficacy, achieved yields and arisen costs.

The main goal of this project was to gain a comprehensive evaluation of costs and effectiveness for the surveyed weed management practices and to derive recommended actions from it. A global business intelligence platform with the information of regional trials displaying as dynamic dashboards was built to reach the goal of the project.

Challenges

The previous recorded assessment data is highly heterogenous across different localities. To create the central platform, a global homogenous data format needed to be introduced to adapt the regional scheme. This is a key requirement to enable a unified documentation and analysis of the experiments. A uniform data format also makes it possible to automate the transformation to a machine readable format.

The dashboards needed to be dynamically adaptable by the user, so that specific relevant reports can be created and exported. Besides, regional differences in product or labor costs and varying selling prices of the harvested crops needed to be taken into account.

Evaluation of average Efficacy and Yield for different Weed Management Practices*

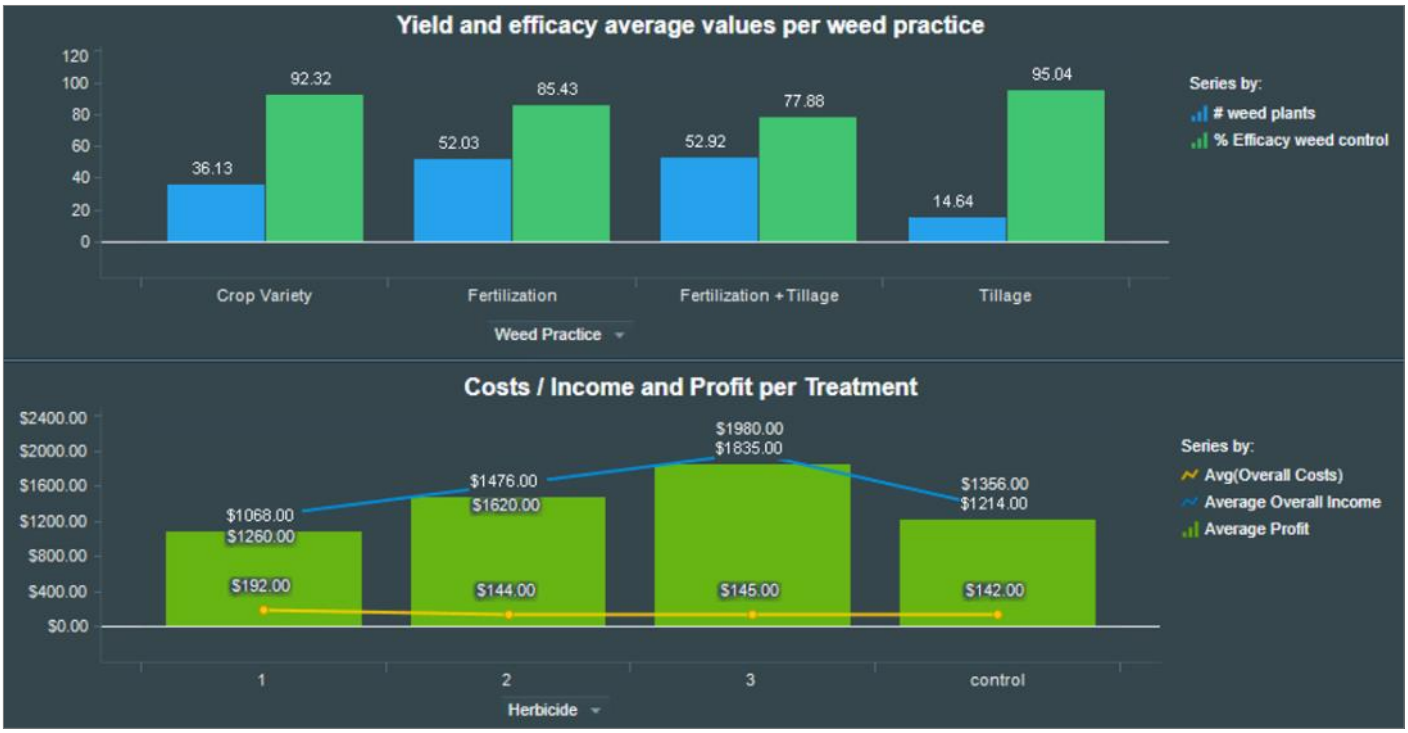
Implementation

A broadly adaptable template for data acquisition was designed for the heterogenous data sources. The existing data was transferred to the templates and future assessments can be documented in the same format. R, along with its wrangling package dplyr was involved in the data transformation process.

The global, central platform was built on Tibco Spotfire. It combines various regional platforms and evaluates the cost-effect across regions. The created dashboards and reports are accessible via web browser.

By including filter panels and hierarchical attributes, it is possible to dynamically adapt the reports by filtering and switching between attributes, as well as drilling down into more detailed graphs. This enables data exploration in an intuitive way.

Through implemented ad hoc calculated features and input fields for changing costs and selling prices, the analysis can be adapted to regional circumstances. For easier navigation the users can quickly switch between saved views to apply frequent and relevant filter sets.



Graphs for agronomic Weed Management Practices and Profit Evaluation*

Project Outcome

The assessment data for several countries and the corresponding experiments was successfully imported to the central platform for weed management analysis. Results of more countries, as well as future experiments will be added continuously. All existing graphs and filters will expand automatically as new data is added.

Dynamic dashboards provide producers a fast solution on economic evaluation of individual weed management practices as well as usage of particular products.

Through the standardized data acquisition and data wrangling, the data can be further analyzed by using machine learning methods. Also the weed management data can be merged with assessment data of other experiments, weather data or more detailed products information. This opens up completely new analytics possibilities.

*data was changed or simulated for publishing purposes