

Agricultural Productivity Increase with Precision Technology

Preeti Devatwal and Sharvan Kumar Yadav

Agriculture University, Jodhpur (Rajasthan)

Maharana Pratap University of Agriculture Technology, Udaipur, Rajasthan

ARTICLE ID: 095

Introduction

It is measured as the ratio of agricultural outputs to inputs. While individual products are usually measured by weight, which is known as crop yield, varying products make measuring overall agricultural output difficult. Therefore, agricultural productivity is usually measured as the market value of the final output. This productivity can be compared to many different types of inputs such as labour or land. Such comparisons are called partial measures of productivity.

Precision agriculture

Precision agriculture (PA) is a farming management concept based on observing, measuring and responding to inter and intra-field variability in crops. The goal of precision agriculture research is to define a decision support system (DSS) for whole farm management with the goal of optimizing returns on inputs while preserving resources.

Quality of seed

Agricultural productivity depends on the quality of seed with which farmers sow their fields. Therefore, crop yield on their farmland, agrarians are recommended to sow only certified seeds. Certified seed may cost higher than those that do not have certification, but the result will be worth it, because the proper quality of seeds is one of the main factors that affect the crop yield.

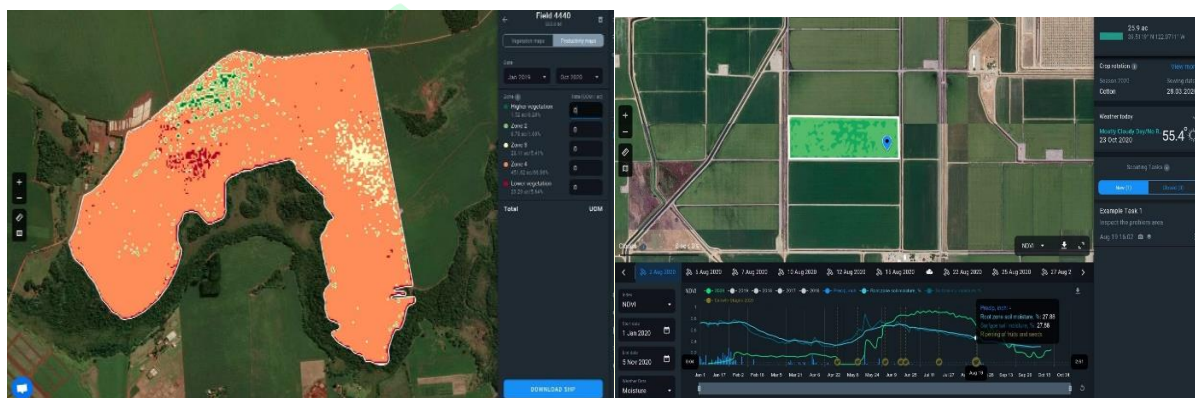
Field productivity zoning

In this approach, a grower can plant seeds more densely in the areas with greater productivity, potentially getting increased crop yield and do not waste them much in the some with low productivity. Also such zoning allows farmers to properly treat the field area with lower productivity and take all necessary actions to increase soil fertility.

Monitoring crop growth

Satellite monitoring of land plots, allows farmers to easily follow the growth status of plants and carry out crop yield estimation using remote sensing, the evolution of plant health estimation using remote sensing. The evolution of plant health status provides key information to decide on possible interventions to the needs of crops.

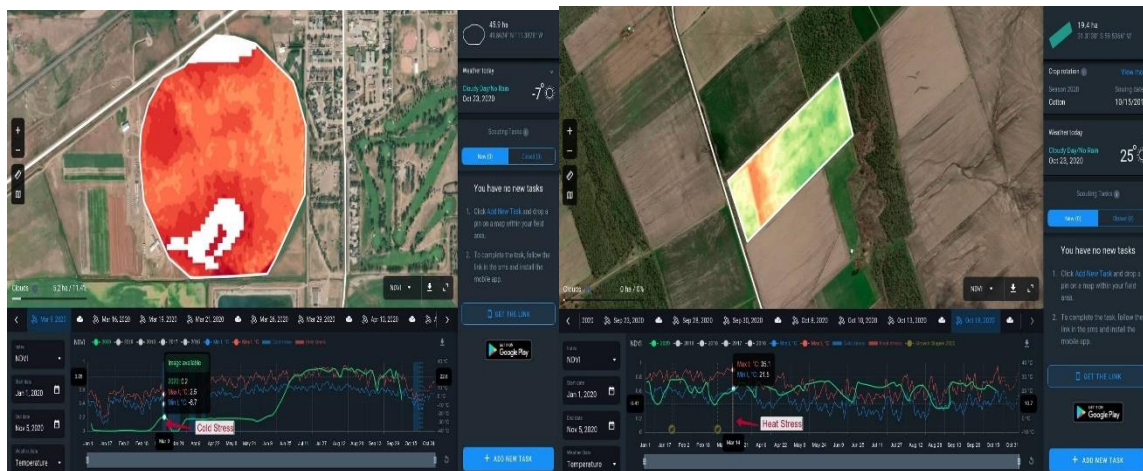
Even though satellite do not erasure the stage of plant growth directly, but with spectral indices. Crop monitoring also provides data on daily temperature, analyzed their dynamics in times and calculate their total sum.



- ✚ **NDVI:** Normalized difference vegetation Index
(Recommended during the active stage of crop growth)
- ✚ **MSAVI:** Modified soil adjusted vegetation Index: it is best to be used at the early stage of crop growth
- ✚ **NDRE:** Normalized difference Red edge Index- recommended to be used together with the NDVI index.
- ✚ **ReCI:** Red edge chlorophyll (most relevant during early and active growth stage of crop growth).

Accurate weather prediction

The average crop yield per acre on a given field is very much condition weather factors, with the same quality of soil and the same species of seeds planted, the climate condition have a predominant influence on the development of plant and, consequently on yields. the use of crop monitoring software in precision farming gives agrarians a possibility to take preventive measures as to protecting their crop yield from possible damages cause by weather extremes.

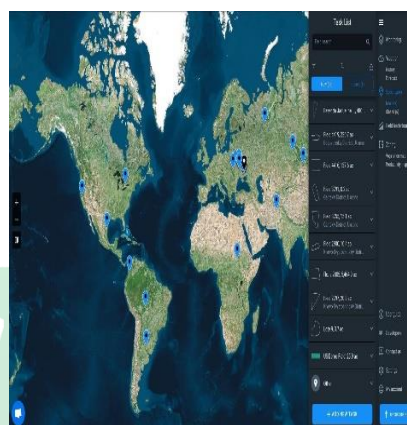


Cold stress

Heat stress

Regular scouting

Scouting is one of the important parts of agribusiness management aimed to ensure proper development of plant and increase crop yield. Crop scouting solution is intended to save time and replace a tedious work of human experts on field. All that is needed to do is to log into your crop scouting app, check for any problem areas on your land plot detected by a satellite tag these areas on the map and organize closer scouting of these specified zones.



Proper irrigation

Farmers who aim to increase an average crop yield per acre on their fields must have a streamlined irrigation system at hand. Providing the plants with the appropriate amount of water directly affects the development of plants and consequently, the crop yield. Effective irrigation of farmland is closely linked to weather forecast. Today’s technologies special applications and software for farmers provide access to hyper local weather forecasting. It open the door for precision irrigation and allows agrarians to plan in advance and organize irrigation of their field in the most accurate and efficient manner.

Smart application fertilizer

Fertilizers are intended to nourish the various types of soil, boost plant growth and increase yields their use should be balanced and prudent. Using too much fertilizer can

negative affect the soil quality and therefore the agricultural productivity. Within one field, different areas may have different needs for soil fertilization. This accurate approach to field fertilization helps keep the soil in good health, which helps increase the average cop yield per acre.

Crop protection methods:

- **Weed and pest management:** Weed management and pest control are the biggest challenges for farmers during the growth season. A single weed, for instances, can generate over 10 million weed seeds and if they are not managed in time, it can substantially decrease the yield. Pest control also requires a comprehensive management approach from agrarians. As pests are highly adaptable fast reproducible organisms that can threaten the yield on a particular farmland, farmers must always be ready to respond to the pest infestation issue in a timely manner.
- **Plant disease prevention and management:** The important threat to growers agricultural output is represented by plant disease. The management methods like selecting disease resistant or disease tolerate varieties treating seeds with fungicide and applying pesticides and other similar substances on developing plants. It is very important to protecting plants in a timely manner is crucial for crop yield per acre indicator the sooner a problem is identified the fatter and easier it will be solves and the fewer field acres will be affected.
- **Soil testing and its quality:** the quality of soil, i.e. its fertility is one of the main factors that affect crop yield. Apart from agriculture productivity the soil quality also influence the cost for a farmer to grow one or another plant, as some of them require certain ratios of specific elements in the soil, like minerals particles, organic matter, water and air etc. to attain increase crop yield farmers need to maintain the soil in good health on there is to practice crop rotation, among others.



- **Forecasting crop yield:** crop yield prediction is very important for global production of food. Government all over the world use analytical data concerning crop yield forecasting to take grounded as to their national import operations.

Conclusion: Taking into account all the above, it could be said that there is no single and universal method of increasing an average crop yield per acre on a farmers land plot. It is a art combination of different agricultural efforts that can vary depending on unique characteristics of a growers field. Crop monitoring software can be of considerable help for farmers with most of such agricultural efforts, assisting them whether directly or indirectly accurate monitoring of separate agricultural activities and substantial facilities of their implementation.

