# Ramping Crop Yield in Districts of India

*Deployment Recommendations Report*

**Version 2.0**

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# Deployment Framework

Harvestron is a machine learning model trained and evaluated on different supervised machine learning algorithms mainly Random Forest, AdaBoost and XGBoost regressors solely on JupyterLab environment. Its primary goal is to provide the Indian farmers an overview of approximate amount of yield that can be produced once they enter details of their crop, area in which the crop will be harvested, the year, the state, and the specific district in which they will be harvesting. Since, after conducting deep research onto understanding the backstory of Indian farmers, it was crucial to understand how mistreated the farmers had been and had to continuously protest for non-complimentary rules and laws that they were forced to follow. This often led to many farmers costing their valuable lives. Therefore, to pay attention specially to the Indian farmers and contribute into providing a well and care life to them, Harvestron was built.

Moreover, with the ability to get the crop yield's value, the functionality to provide the up to date weather and climatic report was also accomplished by conducting web scraping.

## Data Storage and retrieval

### Training data Storage

Both of the training and testing data contain 246091 rows and 7 unique columns of State, District, Year, Season, Crop, Area and Production. In addition, the dataset was taken from the official data.gov.in website which increases the accuracy and management of data. The dataset was downloaded and stored on the local computer.

### Data Storage

The dataset consists of a csv file with all the data contained and it is 14,6MB size on disk. The method chosen is storing the csv file locally on my pc. The reason for this is because the aim of my project was to consider values of different states with their districts, but also use season in which the crop was harvested with the area owned by the farmer, and while conducting my research, I came across this data available on the official governmental data website of India which provided the exact variables in a csv format file. In addition, using a csv format has its pros of availability and easy access and the freedom to mend the data according to the needs. Therefore, I saved the data locally on my personal computer and uploaded it on JupyterLab for usage.

# Frameworks and tooling

## Visioned Impact

The visioned impact of my model Harvestron is to primarily help Indian farmers in better decision making for their crops by providing them a platform in which they are able to enter the important details associated with predicting the yield of a crop. India has reached a stage in development where it needs 'evergreen revolution', i.e., producing more in less land with less water. Agri-business and Agri-processing should be the main drivers of this revolution with crop diversification as one of the main strategies. The main areas where I believe this model can impact is as follows:

1. AI holds the potential of driving an agricultural revolution at a time when the world must produce more food using fewer resources. The potential to pay dividends to farmers in efficiency gains and higher incomes is important. Keeping this in mind, in order to ensure productive results are being generated in less resources, Harvestron can provide quick and accurate results in understanding the behavior of a crop in different states and area/land

occupied.

2. Weather forecasting and predicting climatic disasters will also benefit from artificial intelligence and machine learning. As a result, incorporating these innovations into precision farming will assist farmers in determining the best course of action for preventing potential damage to their crops. They may also determine which type of crop to plant and when to plant it based on these forecasts.

3. They will be able to make more educated decisions in less time compared to the automated work processes. Agriculturalists may take more preventive measures to increase the crop production cycle with the help of this technology.

### Tool for the task at hand

Since our model is fully made on JupyterLab with Python as our programming language, efficient data management, storage and augmentation has been performed. After ensuring all the data showcased and used are legit, the possibility to create an online platform/application connected with the machine learning algorithm which instantly lets the end users to enter their values for the fields of State, District, Year, Crop, Area and Season would be fruitful.

## Feedback and Iteration

Receiving feedback on the Harvestron is the main priority mostly because it informs us how the application/model is being beneficial to our end users, the Indian farmers. The aim is to be successfully being able to test the model with our actual end users but keeping the target location in mind, through the use of cloud system, the application when formed can be delivered directly to the Indian farmers and be put to use.

### Ensuring Continuous Delivery

For ensuring continuous delivery, if future versions of Harvestron are to be implemented with high enriching and fulfilling features, the author would stay in contact with the several stakeholders classified, who are active users of this model. In additional, by having fruitful communications with our client, the release of our model can again be available through locally serving it.

## Conclusion

In conclusion, after having created and evaluated Harvestron, the goal would be improving better decision-making process of Indian farmers in researching and implementing and coming to a conclusion on which crop to harvest, in their area/land owned by them. With the hope of creating a better lifestyle for Indian farmers so as to not having them risking and costing their lives, Harvestron was built. By continuous feedback and deployment of Harvestron, the model can be accessed to the Indian farmers who aim at using Artificial Intelligence in improving their businesses and perform data driven solutions.