

Ocean x Dimitra Data Bounty : Phase 1 – Ideation

In this report we will see :

- Global view of yields by district and crops in Madhya Pradesh
- Ideas for improving crop yields in Madhya Pradesh
- Source of information

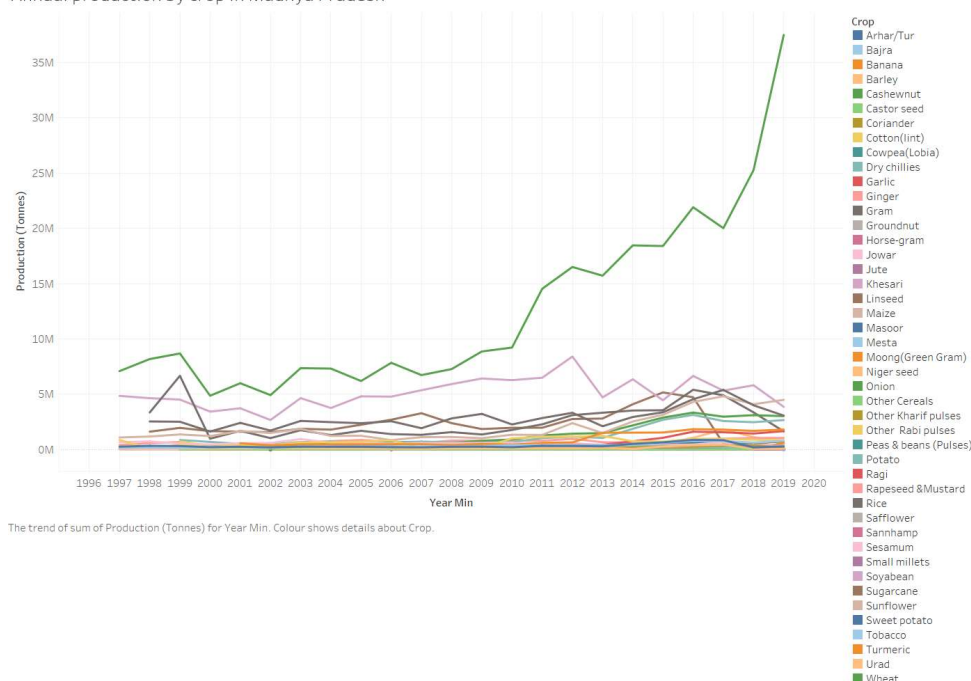
I. Global view of yields by district and crops in Madhya Pradesh

In this section we will analyze the evolution of crop yields in Madhya Pradesh over the last few years by comparing the districts between them. This part will allow us to have a global vision on the products cultivated in this state of India as well as to understand the possible disparities between the districts of Madhya Pradesh.

To do so, I will use the 2nd dataset of this Data Bounty which is an Excel table that I will first transform into a CSV file in order to derive information.

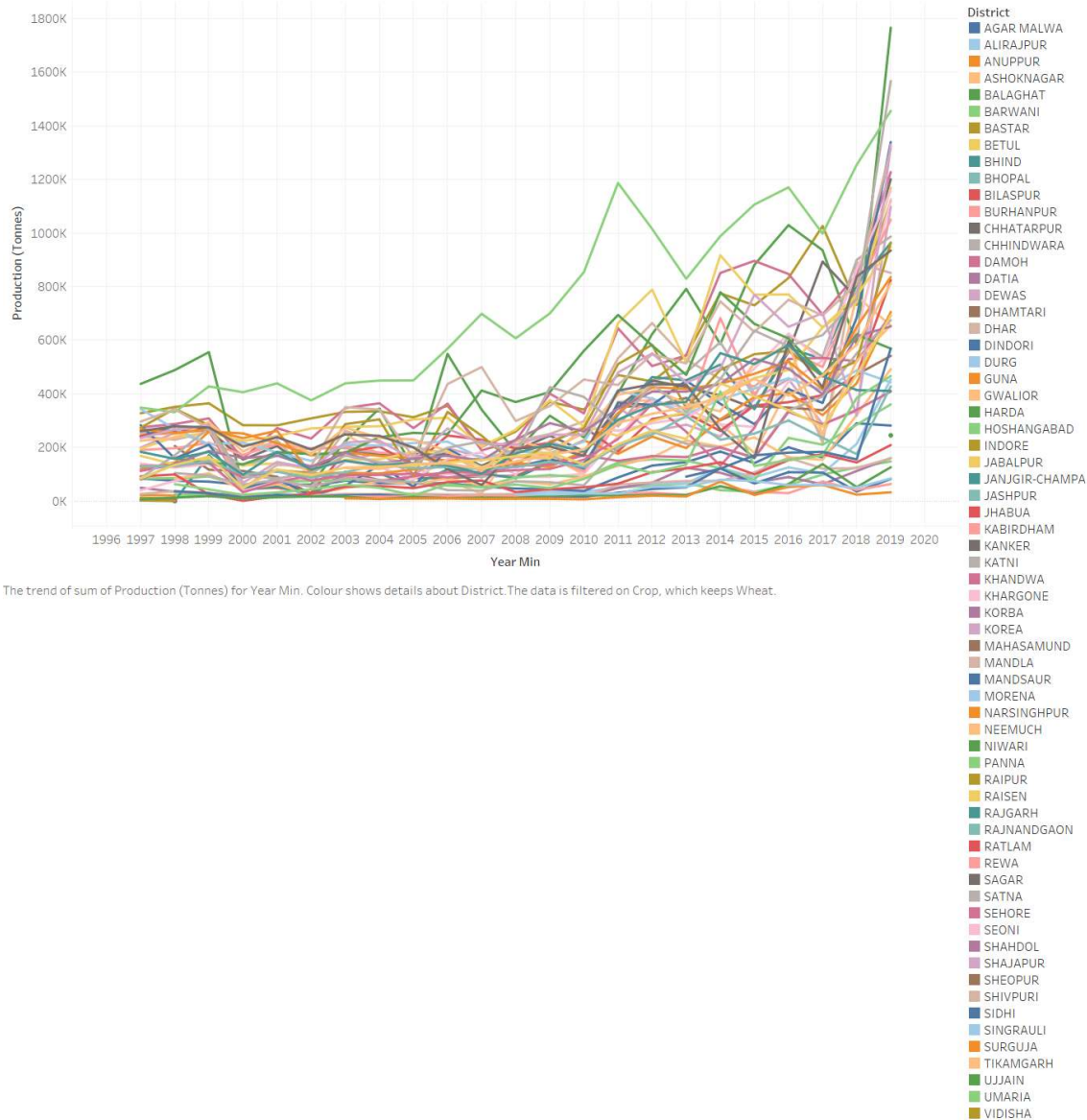
Here are the visualizations of the data extracted from this file:

Annual production by crop in Madhya Pradesh



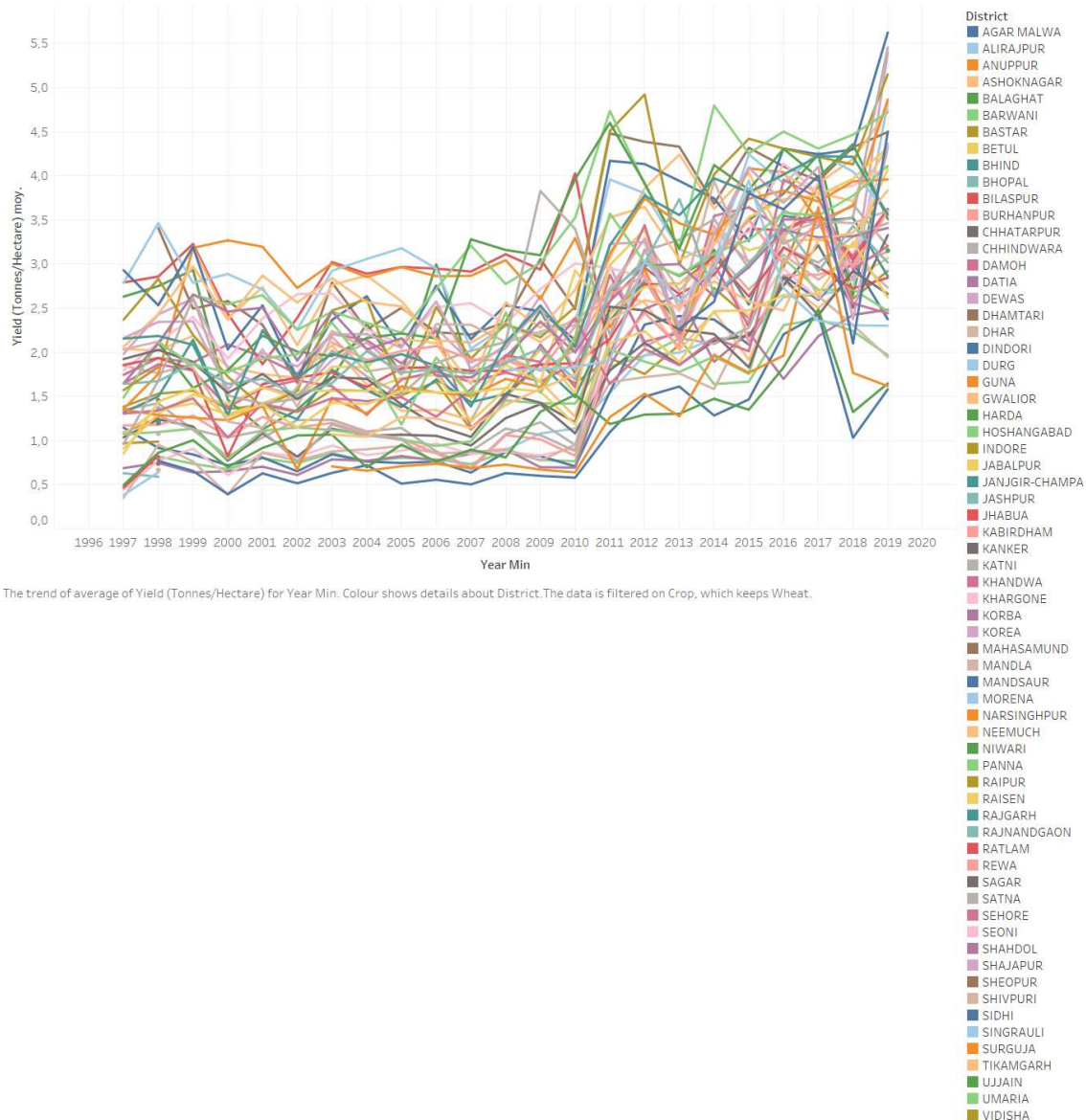
Since wheat is the main crop in Madhya Pradesh, we will use it as an example in the graphs comparing yields and production in each district. As for the other crops, their comparison are all available in the "graph" file attached to the submission (to be opened with the Tableau software).

Annual wheat production by district in Madhya Pradesh



We notice here that the annual wheat production varies a lot according to the districts but that it is increasing in all cases. Let us now observe the wheat yield by district:

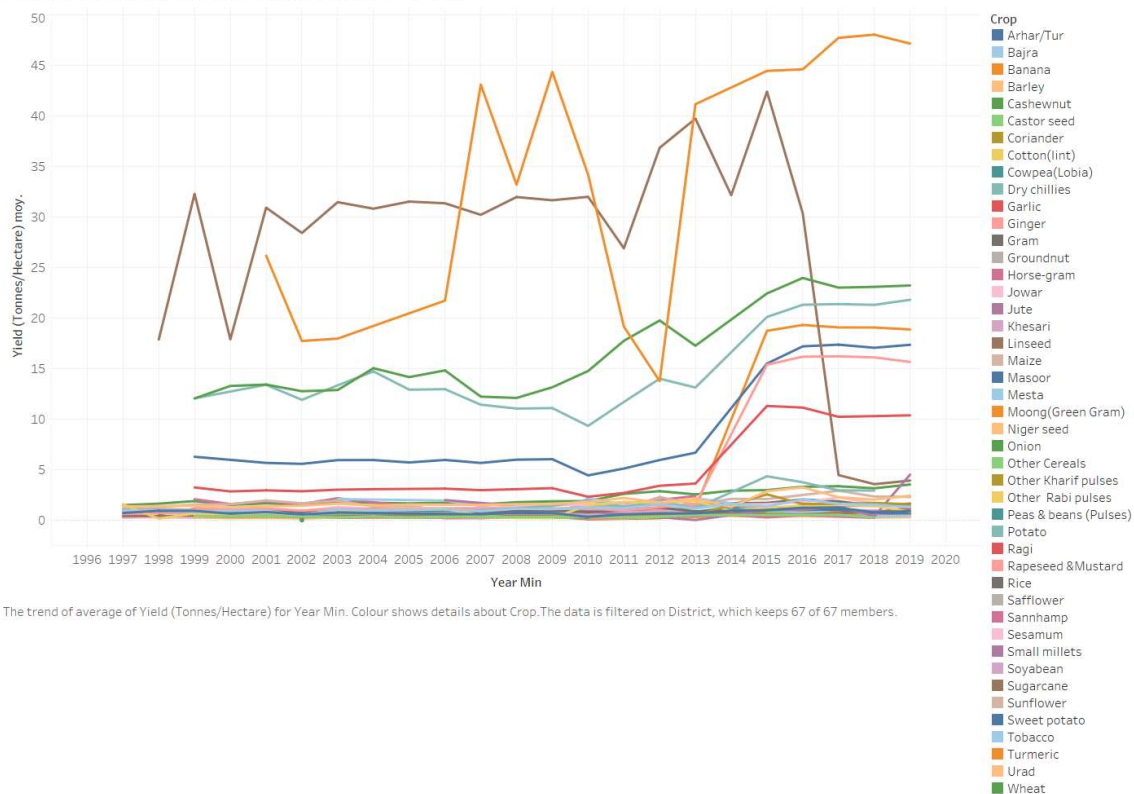
Average annual wheat yield by district in Madhya Pradesh



This graph gives us some very interesting information. Indeed, where the differences in annual wheat production per district were explicable by the size of the production areas, we also observe here large differences in terms of yield between districts (ranging from 0.5 tons/hectare to more than 4 tons/hectare).

Now that we have compared the districts with each other, let's compare the crops with each other:

Average annual yield in Madhya Pradesh by crop

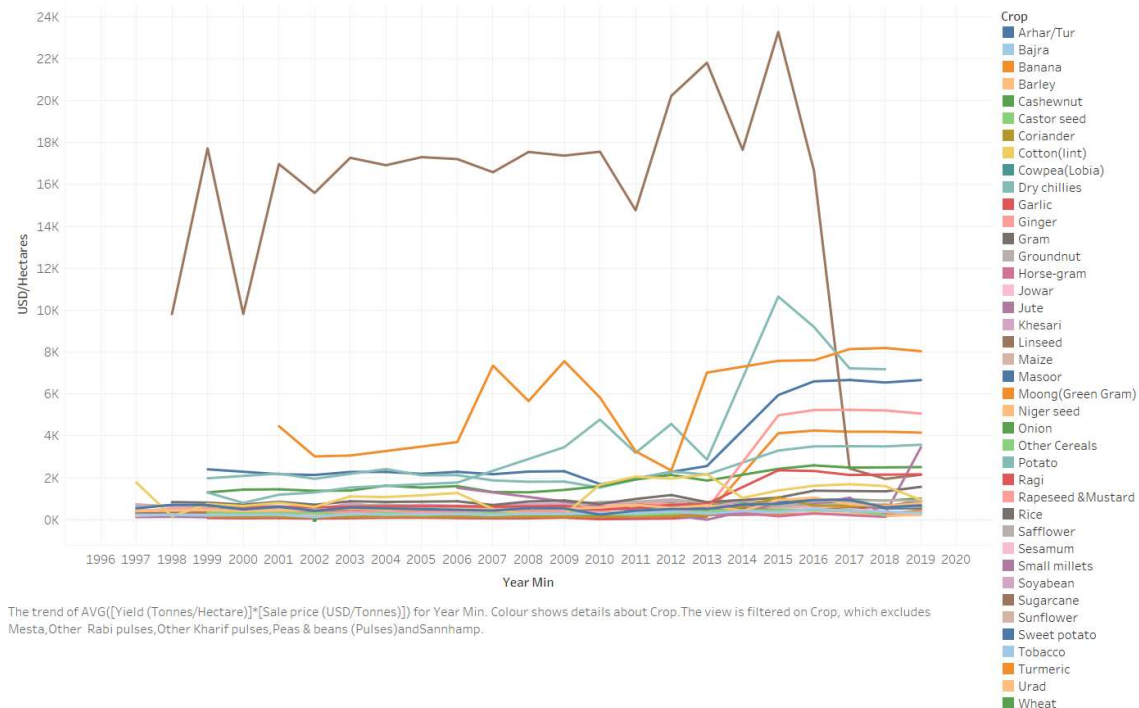


This graph shows the yields in tons/hectares of the different crops in Madhya Pradesh. We observe that the best yields come from bananas and sugarcane. We cannot conclude anything on this graph because we need to cross it with the world average yields of these same crops to determine if these crops are efficient in this state of India.

Nevertheless we can start from this graph to create another much more interesting one, the one of the average turnover per hectare and per crop in Madhya Pradesh. To obtain this graph we need to know the sales prices of each crop in India. I looked for this information on the internet by averaging the sales prices of crops in India over the last 12 days (see details in the "Prices" file).

We then obtain this graph:

Average annual turnover in Madhya Pradesh by crop



Thanks to this graph we can determine which crop has the best turnover in Madhya Pradesh which allows farmers to cultivate crops with a high turnover (really it would be necessary to take the net margin instead of the selling price but this information is not easily found). It can be concluded here that sugarcane has the highest turnover per hectare with more than 10,000 dollars per hectare per year.

II. Ideas for improving crop yields in Madhya Pradesh

Now that we know that there are great disparities between regions, I propose 3 ideas to improve the crops of Madhya Pradesh.

- From an economic performance point of view, I propose to make the same graph as the one "Average annual turnover in Madhya Pradesh by crop" but with the net margin instead of the selling price so that farmers can determine the most profitable crops for them.
- Since there are disparities between regions regarding yields for the same crop, there are soils and weather conditions that are favorable to certain crops. I therefore propose to cross-reference this data set with the soil and weather data. Once this work is done, we could establish a map showing the compatibility of each district with the different crops.
- Finally, if we find correlations between yields, soil and weather. We could build a machine learning model predicting yields for each district and each crop. We could also cross-reference this with the evolution of the net margin of the crops for a better management of the agricultural budgets.

III. Sources

- <https://agmarknet.gov.in/>
- 2nd dataset