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| Eastern Oregon University |
| Herbicide Calculator |
| Proposal Document |

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# General Description

My capstone project will be a website for farmers, ranchers, gardeners, and landscapers. The website will provide its users with information on spraying weeds with herbicides. The website will provide several key functions to simplify and make the choosing and application of spraying herbicides in their fields, pastures, lawns, and gardens. To achieve this the website will take a crop or crops and the desired organisms the users want to eliminate. The first major function of the website it that it calculates chemical herbicide options that will have effective results in eliminating the weeds and not harming the users crops. This function will also provide information such as comparative costs between herbicide or combination of herbicides. It will include possible locations to buy the spray and a comparison of costs. Another feature is that the website will calculate the amount of herbicide required to spray the entire area. It will also calculate the ratio of herbicide to water for any sprayer given the tank size.

# Object / Purpose

The purpose of the project is help users choose chemicals to spray their land and apply the chemicals to the land effectively and correctly. There are several factors to consider in making that make this decision. The first factor is what weeds the farmer desires to eliminate. The second factor is to the crop. The farmer must choose an herbicide that is safe on the crop but will eliminate weeds. That can be challenging enough but the farmer will also want to consider the cost of herbicide. This requires knowing the gallons of chemicals needed. Since different herbicide require different concentrations to be effective comparing the price per gallon can be misleading. The website will simplify help the user consider these factors. There are other factors that farmer can consider some will be covered in the application, but the rest are out of the scope of this application.

# The problem your software will solve Intended Audience

There are thousands of herbicides to consider for each application. This makes making an informed decision on what to use a difficult one. The decision has multiple factors consider. The first factor a farmer needs to consider is what herbicides will not harm their crops. However, the second factor and just as important is that the herbicides eliminate the weeds. Generally, the user will have to consider multiple weeds to eliminate. So, the use of combinations chemical sprays is sometimes required which requires even more knowledge. Since some combinations of chemicals will work together, they could have unintended effects such as not working or harming the crops or neutralizing the effects of the herbicide on the weeds. Also, sometimes a single herbicide will do the same job as multiple chemicals. Another problem the website will help with is comparison of costs. Each chemical can require different application rates. If there is not enough herbicide the spray will have limited effectiveness and could possibly have no effect on the weeds. Too much herbicide can damage or kill the crops. With that in mind comparing costs is not as simple as comparing the price per gallon. The required pints per acer of herbicide must be considered. Herbicides are mixed into sprayers with water to achieve the required concentration to meet the pints per acer of the herbicide or herbicides. The website will provide the amount of water and herbicide needed for the full tanks and the partial tank of the sprayer. The website will also provide the total amount of chemical, and water required so that the farmer can order the user and possibly water. With these features, the website will decrease the knowledge required to spray herbicides and simplify the preparation and planning for the application of herbicides.

# Ethical Concerns

This website has some possible ethical concerns. Failures in the accuracy in the information can be detrimental to the user. These determinants can range from loss in money to the death of crops. For example, the spray could be ineffective at the suggested concentration or simply not effective. This would cause a loss money from the money spent on chemicals, diesel for the sprayer, and the man hours driving the sprayer. On the other hand, the spray could damage or kill the crops costing the farmer not only their future profit but also the money spent planting, watering, and fertilizing their crops. Herbicides by their nature can be dangerous to the user and the environment. Failure to recognize these dangers could cause harm to users who fail to heed or read the warning labels on the chemicals. Spraying herbicides also has its own ethical concerns but they are outside of the scope of this project. With these ethical concerns, this website will do its best to mitigate those ethical concerns.

# Intended Platform(s), Software Tools, and Programming Languages you will use

The spray calculator will be a website. The website will use~~F~~lask for the web framework. Flask will also provide the interface between the other tools. Python will be the base language. MySQL will be used for the database. HTML, CSS, and JavaScript will be used on the front end. The frontend of the website will be tested using Selenium IDE. The backend will be tested using python unit testing and Selenium. Ubuntu will be the operating system that will host Flask server and MySQL.

# Key Features – What makes your product special?

The main features of the app are all key features. This product offers all these features in one place and incrementally uses information to create a customized solution for its users. The product is not set to any one brand or set of brands which gives the user more options and potentially better options. One special feature is the comparison of effectiveness on one or multiple organisms. This feature is combined with the fact that it does not focus on any one brand makes this a powerful tool for deciding what chemical to use. This website allows farmers to compare costs of chemicals accurately rather than my comparing the cost per gallon.

# Glossary of Terms

Application Rate: The rate at which the mix of herbicide and water is applied to the field

Crop: Crop is a group of plants grown for profit.

Herbicide: A chemical or organic substance that is harmful or deadly to unwanted plants.

Sprayer: A device to spray liquids in controlled manner.

Web Framework: A web framework is a set of software tools that aid in the management and development of a website.

Weed: Weeds are plants that are not grown for profit and are unwanted.