



# GREEN WAVE SCIENCES

## Executive Summary

Green Wave Sciences will introduce a revolutionary, environmentally friendly method of controlling crop pests through microwave soil sterilization. Each year the farming industry spends approximately eight billion dollars in chemical pesticides, germicides, and other soil treatments that ultimately result in increased consumer prices. Now, through the use of earth friendly microwave frequency electromagnetic waves we can eliminate these costly pesticides and the unwanted environmental hazards caused by their application. Through the use of cutting edge microwave technology, Green Wave Sciences will provide a series of products designed for both global and farm-specific applications. Interest for this novel approach will be targeted at government and independent farmers alike. Each product solution will be founded on the same fundamental principle - the application of microwave frequency electromagnetic waves that kill soil-borne pests and viruses without harming the environment.

To facilitate implementation, this series of soil sterilizing products will be designed and manufactured as an attachment to industrial tractors or may also be installed as stationary units. This will maximize the market reach by targeting tractor manufacturers to sell the products as an accessory item or as a stand-alone solution. The intended end customers for this series of products are produce farmers, greenhouse owners, and small grain farmers. Through capital investment in our product suite, these customers could avoid spending hundreds of dollars per acre every year in expendable and harmful pesticides. The products produced by Green Wave Sciences will give these customers exactly what they require, which is a less expensive, less regulated and non-expendable solution to controlling soil-borne pests.

The Green Wave Sciences product solution uses a microwave source powered by an electric generator mounted to a tractor. The microwave source applies targeted microwaves into the soil in a controlled and repeatable application process. That microwave energy heats and kills soil-borne pests without otherwise altering the surrounding soil, and/or groundwater; furthermore, this method does not require a waiting period (of up to two weeks) between sterilization and planting, a common flaw of current chemical soil sterilization methods. Without the need for this waiting period, the user is able to overcome uncontrollable weather events that affect time sensitive planting periods.

Green Wave Sciences realizes the need for proper safety precautions when dealing with high power electromagnetic radiation, and has placed the safety of its consumers as a top priority. Each system will employ two primary safety features. If the fields outside the unit exceed the FCC limits for human exposure, or if the unit loses contact with the ground, then the power to the generator will be immediately disabled. Furthermore, the operator will have access to a kill switch that will automatically shut down the device. We believe that these precautions will cover any possibly hazardous scenarios in the field.



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Team founder Dr. William Joines has patented the Green Wave Sciences solution detailed in the preceding paragraphs. This patent protection ensures that competition for the market will remain at a minimum. Green Wave Sciences believes that the market for eco-friendly solutions will only grow and gain support as the world's population, price of chemicals, and government regulations continue to rise.

In the near term our company is seeking funding for the first year of development and testing that may lead to further licensing. These funds will cover the research, lab equipment, and personnel for the first year. It is our hope that a construction-ready design with manufacturing-grade drawings will be produced by May of 2011, and a working prototype will be built by September of 2011.

## Primary Team Members:

Dr. William Joines (PhD EE, Professor in Pratt School of Engineering)

Paul Barbee (ECE Graduate Student, Pratt School of Engineering)

Michael Bell (ECE Undergraduate Student, Pratt School of Engineering, Pratt Fellow)

As well as several other contributing members.