

LASER PULSE

Long-term Assistance and Services for Research (LASER)
Partners for University-Led Solutions Engine (PULSE)

Salvation Farming Solutions Field Protocol

SUPPLEMENT TO AGREEMENT NO. AID-7200AA18CA00009

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ABOUT LASER PULSE

LASER (Long-term Assistance and SErvices for Research) PULSE (Partners for University-Led Solutions Engine) is a \$70M program funded through USAID's Innovation, Technology, and Research Hub, that delivers research-driven solutions to field-sourced development challenges in USAID partner countries.

A consortium led by Purdue University, with core partners Catholic Relief Services, Indiana University, Makerere University, and the University of Notre Dame, implements the LASER PULSE program through a growing network of 3,000+ researchers and development practitioners in 74 countries.

LASER PULSE collaborates with USAID missions, bureaus, and independent offices, and other local stakeholders to identify research needs for critical development challenges, and funds and strengthens the capacity of researcher-practitioner teams to co-design solutions that translate into policy and practice.

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ACRONYMS

USAID	United States Agency for International Development
SFS	Salvation Farming Solutions
CDCS	Country Development Cooperation Strategy

Project Background

This project is related to the last two of the three priority areas identified by USAID in the Country Development Cooperation Strategy (CDCS) for Zambia: promotion of open and accountable governance; development of citizen capacity; and improvement in the capacity of the economy. Addressing the second priority area (development of citizen capacity) calls for the reduction of rural poverty by addressing the factors that hamper the productive capacity of rural enterprises, including the availability of credit. USAID's stated goal in the CDCS for Zambia is to partner with the government, civil society, and private sector to advance the country's self-reliance through more effective development choices and governance, enterprise-driven economic growth, and increased resilience among its vulnerable citizens.

In response to the above, the goal of our project is to improve the food security status of Zambia by improving the productivity of maize farmers in the country. Our objective is to create awareness of Salvation Farming Solutions (SFS) techniques as a means of increasing the productivity of maize farmers in the Chipata, Chilanga, and Kabwe regions in Zambia. Our second objective is to demonstrate the effectiveness of using SFS production techniques in maize production on selected farms in the Chipata, Chilanga, and Kabwe regions in Zambia. The third objective of our project is to train extension agents, key informants, and stakeholders on how to use SFS techniques in the production of maize in Chipata, Chilanga, Kabwe, and other regions in Zambia. The protocol will be used for the training of extension service providers and farmers who will be participating in the project. The Salvation Farming Solutions (SFS) Science team will train the country project facilitators.

We will convene a meeting of a gender-inclusive group of farmers in each of the three study regions and obtain information on their current management practices related to maize production. Farmers who volunteer for the project will be requested to divide their land devoted to maize production into two parcels. On one parcel of land, the project farmers will be requested to produce maize using conventional practices while the other parcel of land will be under SFS techniques. Average yields per acre and return on investment will be compared for the two methods of production to demonstrate the efficacy of SFS techniques and promote its adoption as a method to reduce food insecurity, reduce poverty and use resources such as land in a more sustainable way.

Instructions for Maize Trial Product Use

The **TRIAL KITS** contain 2-sets of SFS treatments packaged in one-ounce bottles. The objective of the SFS Trial Kit is to demonstrate the effectiveness of the SFS program alongside the currently existing farm program. Two kits are being provided in order to do studies on Maize side-by-side analyses.

- ✓ Each SFS Kit contains a total of 8 bottles to treat one acre.
- ✓ The SFS Science Team will work to consult in all areas in the preparation of the site including documentation and analysis, treatment mix, and application of the Sample Kit components.
- ✓ The SFS Trial Participants will share the results of each growth study by submitting them to our Science Team for analysis and will demonstrate the potential to the participants and other observers for the effectiveness of the SFS TRIAL KIT.

Site Preparation

- Two separate grow sites will be surveyed, measured, and plotted with pegged delineations accordingly for delineation between control and treated plots.
- There must be a clear marking delineating and clearly separating the two separate grow sites.
- The layout of the two different grow sites must be at least 10 feet apart.
- Locations of each grow site are to be identified with GPS coordinates and addresses, then recorded on a pre-prepared data sheet for data collection.
- Data must be accurately added onto a data sheet (to be provided) for accurate determination of the growth results.

Photographs

- Each site must be photographed upon planting periodically, preferably after every 4 weeks, with photos sent to our Science Team for data collection and crop analysis.
- A yardstick should be used for measurement in each photograph. The yardstick may be inserted into the soil for the photo.

Measurement of Plants

- It is recommended that one person perform all measurements and a second person record the findings.

Follow instructions carefully

- Both grow sites must be planted on the same day in order to detail the all-time relevant data.
- The Farmer will use the individual treatments contained in each of the bottles which will be properly and clearly labeled with the name of the treatment, the catalog number, the lot number, and the expiration date.
- Materials contained in the SFS TRIAL KITS are for all treatment applications and are to be mixed on-site. The total field coverage for each treatment included in the Kit is sufficient for up to two acres, depending on the application equipment.
- Each 1-ounce treatment bottle should be mixed per instructions provided on the product application in entirety.

Maize PROJECT SAMPLE KIT

Each SFS TRIAL Kit provides enough sample products for Maize growth evaluation for 1+ acre of land. The SFS TRIAL Kit includes four All-Natural Products

Each Kit includes the following:

1. Soil and Fertilizer Treatment - 2 bottles
2. Seed Powder treatment - 4 bottles
3. Premixed Pesticide Spray - 2 bottles

It is important to note that the Grower will receive our products in separate plastic bags. Each different treatment will be labeled with the product description, catalog number, lot number, and expiration date.

It is important for the accuracy and success of the SFS TRIAL KIT analysis, that the Grower follows the instructions for using each treatment and ONLY uses the catalog number for each particular grow site as indicated on the Data Form. Failure to follow these instructions will endanger the results. SFS will not be held responsible for the failure of the Grower to follow all instructions and properly record the data on the Data Form.

Soil and Fertilizer Treatment Concentrate

This all-natural product will help in preparing the soil to plant seeds and will aid in the nutritional availability of the fertilizer for crops. Please follow the application Instructions. It is recommended that the application of the soil and fertilizer treatment be applied through a sprayer to prepare soil for planting. The Farmer can use a backpack sprayer to treat the soil with a fine mist; you want to create a wide surface area of treatment on the soil. Only a mist on the top of the soil is needed; a full soaking is not required and would waste water.

Soil and Fertilizer Treatment Concentrate Application Instructions



- 1) Fill the backpack sprayer with water, then take the bottle of soil and fertilizer treatment concentrate.
- 2) Add one cap full of soil and fertilizer treatment concentrate to the backpack. The backpack sprayer does not need mixing.
- 3) Apply to the soil in an even mist.
- 4) Each time you refill the backpack sprayer you add an additional capful of concentrate.

Figure 1: Farmer can use a backpack sprayer to treat the soil with a fine mist; you want to create a wide surface area of treatment on the soil

FAQs

- A) How does the grower apply the product to the soil if there are already crops in the soil?
- ✓ If the ground is planted in seeds or seeds are sprouted, then it is fine to spray.
 - ✓ Any crops larger than a sprout should not be sprayed as the leaf cover from existing plants will prevent the soil treatment spray from reaching the soil and being fully effective.
- B) Is it OK to use a backpack sprayer that has been used previously for pesticides in the past?
- ✓ Yes, it is fine to use a backpack sprayer that has been used for pesticides; it will not impact the results of the treatment.
- C) When is the best time to apply the product?

- ✓ The best time to apply is in the early morning with a fine mist.
 - ✓ We recommend the soil detox spray be applied before it rains or before irrigation. However, it may be applied during the rain as needed.
- D) How much spray is needed?
- ✓ The contents of the 1-ounce concentrate bottle will treat up to a one-acre plot.
- E) How do I best store any left-over concentrate?
- ✓ It is recommended that you refrigerate concentrates after opening.
 - ✓ The bottle does not need refrigeration until after opening and it is fine to leave the concentrate out in the sun while you are applying it to the soil. However, once you are done, refrigerate the remaining concentrate.
- F) Do I need to use the soil and fertilizer treatment if fertilizer is not used?
- ✓ Yes, in the absence of fertilizer, you can still use the Kit Fertilizer Treatment as the Treatment optimizes nutrient availability from the soil.
- G) Can I save money by using the SFS TRIAL Kit Soil and Fertilizer Treatment and by using less fertilizer?
- ✓ By incorporating the SFS TRIAL Kit Soil and Fertilizer Treatment, you will be able to use 75% less fertilizer in the first year to unlock nutrients in the soil.
- H) What are the other benefits of using the SFS TRIAL Kit Soil and Fertilizer Treatment?
- ✓ The product will reduce downstream water pollution.
- I) Can I use any fertilizer with the Soil and Fertilizer Treatment?
- ✓ See Fertilizer Grid to Determine What Type of Fertilizer Will Be Treated.

DISCLAIMER: In an independent field study, farmers found this product to increase soil vitality; the control vs. treated study comparison showed far greater soil fertility from the use of this product. Further, in independent field trials growers found this product to increase the rate of crop growth, production, and nutritional density and create natural resistance to pests. Farmer conditions may vary from trials; no guarantees are offered or implied.

Seed Treatment Powder

This product will aid in seed germination, faster growth, larger plants and crops, improved harvest production, and increased nutritional density of crops. Each SFS TRIAL Kit contains seed treatment powder to treat one acre of seeds and can treat up to 10 pounds of seeds. Please follow the application instructions below.

Seed Treatment Powder Application Instructions

- 1) Add 10 pounds of seeds or as much as normally used, in a clean and dry 5-gallon bucket.
- 2) Sprinkle all Seed Treatment Powder from the SFS TRIAL Kit onto seeds in the 5-gallon bucket, using the entire contents of the bottle.
- 3) Add 1 cup of water into the bucket containing the seeds and the Treatment Powder and carefully mix the contents with a clean and dry wooden spoon.
- 4) Slowly stir the bucket contents with a wooden spoon until all seeds are uniformly coated with the Treatment Powder (Do not stir the contents with your hands as the oil will interfere with the product performance).
- 5) Plant seeds as soon as possible but not more than 24 hours after mixing.



FAQs

A) When do I coat the seeds?

- ✓ It is best to coat the seeds right before planting.
- ✓ The coating may also be done in advance, just prior to preparing to plant if needed.
- ✓ Be careful to avoid moving the coated seeds and knocking the powder off.

B) What is the best way to store any left-over Seed Treatment Powder?

- ✓ Any remaining Seed Treatment Powder should be stored in a cool and preferably dark cabinet.

Figure 2: A Farmer can use a plastic bag to mix the seeds with seed powder, you shake till the seed kernels are covered with the Seed Powder treatment

DISCLAIMER: In independent field trials, farmers found this product to increase the rate of crop growth, production, and nutritional density and create natural resistance to pests. Farm/growing conditions may vary; no guarantees are offered or implied.

All-Natural SFS TRIAL KIT Pesticide Spray

This product will aid in reducing the damage done by insects on crop plants by killing the unwanted insects while not damaging the soil, plants, or health of the farm or the ecosystem.

- ✓ The SFS TRIAL Kit All-Natural Pesticide Spray can be used on Maize with the presence of insects or even if insects are not present.
- ✓ The Pesticide Spray can be prepared in advance.
- ✓ Premixed Insecticide treatment can be diluted and applied to treat up to one hectare ~ 2.5 acres.

All-Natural SFS TRIAL Kit Pesticide Spray Application Instructions

1. The premixed SFS Trial kit pesticide spray is made up of four (4) components that include the mineral mix; the water catalyst; the oil mix and the integrator. This concentrate can be stored for dilution in the future and may be used for up to a year. The concentrate does not need refrigeration and can be stored at room temperature (may go up to 120 degrees Fahrenheit or 48 degrees Celsius)
2. Dilution
 - a) Fill a 5-gallon bucket with 5 gallons of water (20 liters) leaving air space for storage.
 - b) Dilute the 5 gallons of water with one capful of the All-Natural Pesticide Spray concentrate.
 - c) Add the mix into your sprayer, fill it with water, and apply it to all surfaces of plants where pests are noted or suspected.
3. Spraying:
 - a) After you add the Pesticide Spray to the sprayer, the Pesticide Spray can be applied to all surfaces of the plants. Stir with a wooden spoon. No full soak is required as this will waste water.
 - b) No need to spray the underside of the leaves.
4. Spray Monitoring the Insect:
 - a) After two hours, return to the plot to see what unwanted insect activity can be observed.
 - b) If insects are still visible, a second spray may be applied. Continue daily treatment until no unwanted insects are seen.

DISCLAIMER: In independent field trials, farmers found this product to decrease the survival rate of unwanted insects and achieve a high “kill rate” with no toxic residues. Farm/growing conditions may vary from trials; no guarantees are offered or implied. The above instructions and/or claims are subject to change due to local environmental conditions and other conditions beyond the control of Salvation Farming Solutions, LLC. We would like to congratulate the farmers who have been selected to participate in this trial program and we thank you for participating. We look forward to sharing results with you and engaging you in the future.