

What's Inside:

History and Background

Principles

Step-by-Step Instructions

Success Stories

Conclusion

Published 2012



Figure 1. Emile shows the results of FFF. He is featured in the “Success Stories” section of this document.

Dawn Berkelaar, working with Dr. Martin Price and Danny Blank, featured this farming system in EDN 98. At that time, the technique was known as “Farming God’s Way” (FGW). Subsequently, the name was changed to “Foundations for Farming” (FFF); however, it continues to also be promoted as FGW. FGW and FFF Internet URL’s, links to much more detail, are given at the conclusion of this section. The article from EDN 98 is summarized here using the name, FFF.

History of FFF and ECHO’s Introduction to It

Brian Oldreive, a former Zimbabwean farmer, developed Foundations for Farming (FFF) as a no-till system for raising maize and other field crops. The method encourages faithfulness with all that God has given us—sun, soil, rain, time, seed and harvest—in order to experience the God-given potential of the land. The FFF system involves permanent planting stations, lots of mulch using crop residues, and careful management. In teaching the FFF approach, Brian shows that small-scale farmers can achieve impressive yields with a simple, traditional hoe and wise stewardship of the land (Fig 2).

FFF stems from the observation that in creation, plants grow in areas covered by decaying organic matter (mulch), and without plowing. But it is much deeper than this. It comes from a worldview with an emphasis on a God-honoring lifestyle. It is now being taught, minus the spiritual dimension, by secular and governmental agencies (in these cases it is referred to as Conservation Farming). Some informal reports suggest that a high percentage of those who try it do not continue without the spiritual dimension.

ECHO was introduced to Brian Oldreive through Danny Blank who, as ECHO’s Farm Manager, met Oldreive while traveling in southern Africa as a “roving agricultural reporter.” In November 2006, Oldreive presented the FFF system at the annual ECHO conference. Oldreive began his presentation by giving an overview of the problems in Zimbabwe and other countries in southern Africa. Africa is in dire need of good news when it comes to agriculture, as hunger and poverty are rampant. Maize yields in sub-Saharan Africa average 500 kg/ha, making it very difficult to meet a family’s food needs for the year (estimated at 1,200 kg/household/year). Soil erosion is

a serious problem, with an average of 30,000 kg/ha of soil lost each year. In addition, farmers often have a poor self-image and may be looked down upon in society. Many farmers move to the cities and those that remain often fall into a cycle of poverty and debt that is difficult to break, especially with the high cost of inputs like seed, fertilizer, and equipment. Finally, standards are poor, often due to a lack of knowledge.

Despite large amounts of foreign aid, abundant natural resources, a favorable climate, and good soils, sub-Saharan Africa has large areas where people are undernourished and grain production is erratic, with very low average yields. Oldreive began to question why there is so much poverty in Africa. He noticed that there is no plowing or deep inversion of the soil in creation. As a result, Oldreive studied and put into practice the concept of zero-tillage. Then he became aware of the beautiful blanket over the earth of fallen leaves and dying grass and realized that this was a very important element in God's creation. This blanket breaks the action of the raindrop, allows water to infiltrate and feeds the soil microorganisms. Oldreive understood the importance of mulching and quickly put it into practice.

Oldreive began as a tobacco farmer and, subsequently, he and his family went to work at Hinton Estate, one of the largest privately owned cropping farms in the region (1000 ha). The farm was on the verge of being shut down. There, Oldreive tested FFF principles, initially implementing them on two hectares, and gradually increasing to include the entire farm. Soon "crop yields and profitability had improved so dramatically that Hinton Estate was able to expand [from 1000 ha to 3500 ha] by buying adjoining farms." Oldreive received distinction as "Maize Grower of the Year." Later, he also achieved the nation's highest yield, and twice won an award for provincial wheat grower of the year.

Oldreive is quick to point out that farmers need to make a profit (i.e., income must be more than expenditures) in order for their enterprise to be sustainable. FFF methodology works—the great challenge is implementing it.

Oldreive is quick to point out that farmers need to make a profit (i.e., income must be more than expenditures) in order for their enterprise to be sustainable. FFF methodology works—the great challenge is implementing it.

Certainly the need is great when it comes to agriculture in sub-Saharan Africa. But FFF begins with the premise that no technology on its own will adequately address the poverty in Africa. Before anything else, God needs to be acknowledged.

FFF Principles

Part of the vision statement for FFF mentions an "emphasis on sustainable agriculture as a model for life-transformation of individuals, communities and nations."

The FFF system includes (but is not limited to) the following principles:

- **Spiritual training** (This category actually includes four main principles; more details about this are available from the FFF and FGW websites, and on a series of DVDs that are available from ECHO's bookstore at www.echobooks.org.)
- **Careful management** and **faithful stewardship of the land**. Activities are done: (a) on time; (b) to high standards; (c) with minimum wastage; and (d) with an attitude of joy. Doing the opposite of these demonstrates an attitude of selfishness. Brian Oldreive has written about the importance of being faithful with the little that God has entrusted to us. To begin with, we can be faithful with soil, rainfall, sunlight, heat-units, seed and manpower.
- **Wisdom in caring for the soil**, which includes *minimum tillage* and the *use of mulch* (Fig 3). Oldreive encourages us to learn from creation, in which there is no deep plowing of the soil, and the earth is covered with a natural layer of mulch. From these two observations we see the value of minimum tillage (so that



Figure 2. Pictures of maize planted using traditional methods (left) and using FFF principles (right).



Figure 3. A thick layer of mulch is very important!

the soil retains its natural structure with plenty of oxygen, microorganisms and humus) and of mulching (to protect the soil from runoff and erosion).

- **Wisdom in caring for the crop.** Seeds are planted and fertilized precisely and accurately. *Weeding is done conscientiously at key times.*
- **Giving and generosity.** This is fundamental in reversing the cycle of poverty. If you do not give, you cannot expect to keep receiving. You cannot keep taking from the land without giving back to it. Concentrate on the question, “What can I give?” rather than the question, “What can I get?” Don’t think in terms of money; the type and timing of God’s blessings are in His hands. FFF includes a vision of communities providing for the needy in their midst. Oldreive suggests several ways to give even if you do not have a lot of money. Give the land manure or fertilizer. If you have no manure, use soil from an ant [or termite] hill. Return crop residues to the land to increase the amount of mulch. *Give your effort to do things well. Give your actions (e.g., hoeing). And give knowledge to others.*
- **Hope for the extremely vulnerable,** who have few resources. Per tonne of harvest, FFF requires less hand labor, fuel and/or animal power than conventional agriculture (though the labor input per hectare is higher).

Let’s look a little more closely at each of the elements included above in the section on “Careful management and faithful stewardship of the land”:

- **On-time.** Timing in agriculture is critical. In Zimbabwe, Oldreive observed that maize yields are highest with a planting date on or before November 25, when sunlight, heat and rainfall are at their highest levels. In this case, plants will be knee-high on the longest day of the year. Each day after November 25 that planting is delayed, 120 kg/ha of potential yield is lost. The advantage to planting on time seems clear! According to Oldreive, “In 1997 at a big field day on our farm, a prominent agricultural scientist said that if we could get the national mean planting date for our small-scale farmers two weeks earlier, we would double the national crop yield without making any other adjustments at all.”

With careful planning and scheduling, time can be used most optimally. There are different optimal planting dates for many crops. This means that if you grow more than one kind of crop each year, you will not need to plant them all on the same date. An emphasis on scheduling is required in order to be on time with planning, preparing and ordering supplies—at Hinton Estate, planning started eight months before the planting season!

We also need to have correct balances. “We must not be so driven by time and so busy that we lose sight of God... or so late with everything that we are poor.”

- **At standard** refers to doing things well and in a timely manner.
- **Without wastage.** “Waste” refers to unnecessary loss. Be faithful with little things, and do not be wasteful. Creation demonstrates that God is not wasteful. Think of the water cycle, in which molecules of water are reused again and again. Think of how dead plants and animals are broken down to nourish the next generation of life.

We want to avoid wasting resources. For example, we do not want to waste the gift of the —first rain. When fields are left bare, the land receives far less moisture—especially on sloping land, where most rain runs off the field carrying precious topsoil. However, with mulch in place, the majority of rainfall is stored in the field and accelerates the timing and success of planting.

There are also other wastes to avoid. We waste our integrity and reputation when we are dishonest. Pests and diseases cause loss and wastage, but these are reduced as FFF is practiced. We don’t want to waste energy; according to Oldreive, “FFF done wholeheartedly [and year after year] actually reduces the amount of labor and energy required.”

- **With joy.** According to Oldreive, the great challenge in Africa is to get small-scale farmers to transfer the FFF technology and management principles into practice. He has found that if the vision is shared clearly, and if a farmer is shown how to do a small portion of his crop very well (at high standard, on time, and without wastage), invariably a glimmer of hope enters his heart. The farmer realizes that he is on the road to better yield and profitability. Hope produces joy, which in turn results in encouragement and enthusiasm, providing increased strength for the task.

FFF Step-by-Step Instructions



Figure 4. A demonstration garden, also called a “Well Watered Garden.” The 2004 extrapolated yield on this plot exceeded 11 t/ha.

The way to start with FFF is to first become a learner. Plant a demonstration garden (Oldreive calls it a “Well Watered Garden”) in a strategic location. The demonstration garden is planted on a 6 x 6 m plot, and serves as a “billboard” to the community (Fig 4). Ideally you would start with this the first season (it is a manageable size, so can be done with excellence) and gradually expand the amount of land cropped according to FFF guidelines.

Note that FFF does not require tractors or other mechanized machinery. The only tools that are required include hoes, fertilizer cups, measuring sticks, strings and bottle tops, fertilizer or manure, and seed. Encourage those you train to keep a journal so that they can record activities and determine which practices work best.

Step 1: Land Preparation

FFF fields are prepared during the dry season. Do not plow or burn. Identify the land to be cleared. Mark off the area with permanent corners (e.g., a cemented stake or stone), so that in subsequent seasons you can locate the same —fertility stations that you will be creating.

Clear stumps and weeds from the land. To do this, mark off a 1 m wide strip of land bordering the edge. Hoe the whole 1 m wide strip of land and then mark another 1 m and do the same thing (this is referred to as “eating an elephant;” it makes a huge task seem less overwhelming because you see progress as you work along one narrow strip at a time). Keep the field weed-free after this initial clearing.

Mulch the field as much as possible. Among other materials, you can use the grass growing at the edges of fields. Gather as much as possible—having a thick blanket of mulch is critical for success.

One of the unique aspects of FFF is the use of permanent planting stations, also called “stations of fertility.” These gradually improve each year. Planting stations are carefully laid out in rows on the contour of the land, with holes spaced at 60 x 75 cm (Fig 5). The holes should be hoe-width, with soil heaped on the down-slope side of the hole. In southern Africa, the holes should be completed by the end of October. Dig holes for planting stations in the same way as clearing land, one row at a time. In this way you can estimate how long it will take, and plan your time accordingly. Accurate layout of the stations contributes greatly to the uniformity of the crop, and avoids giving an unfair advantage to one maize station over another.

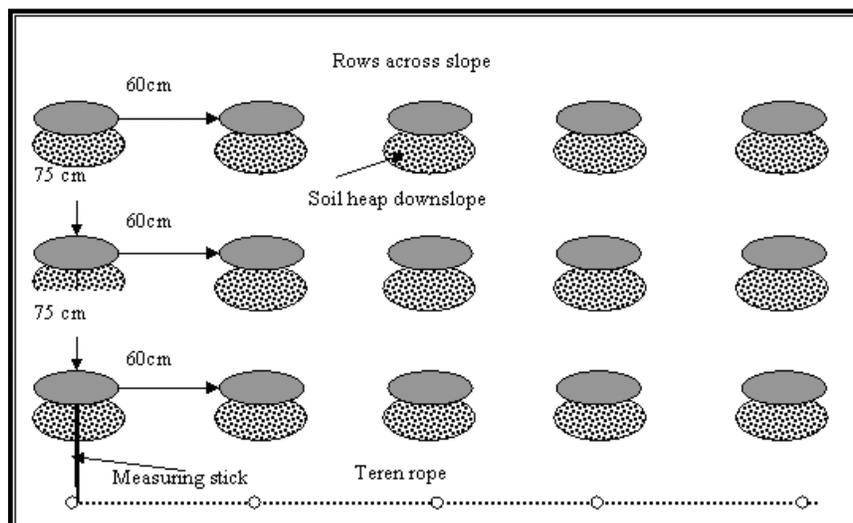


Figure 5. A diagram showing the layout of rows and planting stations for an FFF field.

A soil analysis will indicate whether liming is necessary (to increase the pH of the soil). If lime is needed, place it across the base of the hole. Holes should be dug 8 cm deep for chemical fertilizer, and 15 cm deep if compost and/or manure will be used as fertilizer (Fig 6). Soil from a termite mound can also be used as fertilizer. [Ed: Grant Dryden shared that, with well-formed compost, it may not be necessary to cover it with soil. So holes can be dug to 8 cm (instead of 15) and covering is not necessary. Ninety milliliters per plant station seems to be sufficient.]

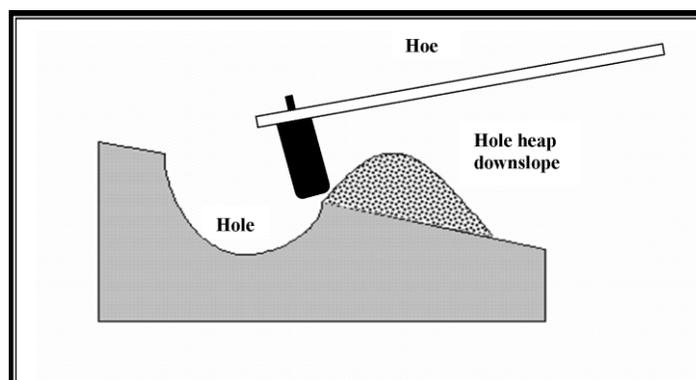


Figure 6. Opening a planting station / station of fertility.

Fertilizer should be applied before the rains. For optimal yields, use a 12 mL cup of DAP (diammonium phosphate), or a 500 mL tin of manure, placed evenly across the base of the hole. Cover the fertilizer with a shallow layer of soil. The thickness will depend on what type of fertilizer is used. If you are using chemical fertilizer, cover it up with 3 cm of soil so that few of the nutrients are lost to the atmosphere. When adding chemical fertilizer to your planting stations, you may need to loosen the soil several inches down. If you are adding compost instead, you will not need to do this.

Aim to have the holes and fertilizer for your planting stations (Fig 7), with mulch in place, a month ahead of planting. Then wait for sufficient rainfall (at the start of the rainy season) to begin planting. In Zimbabwe this usually means early November. Check with local farmers or your local agricultural extension agent for information on planting dates in other areas.



Figure 7. A well-prepared demonstrations garden.

Step 2: Planting

Once the rains have started, plant three maize seeds to a hole (these will be thinned to two seeds per hole when the plants are still young and the soil is damp, for a total of 44,000 plants/ha). Seeds in each hole should be planted in a straight row and covered carefully with soil (make sure there are no clods of soil or rocks placed over the seeds). Plant maize 5 cm deep (as deep as a matchbox is long).

Soybean and wheat are planted in furrows rather than in the planting stations. For soybean, dig furrows 75 cm apart and plant seeds a matchbox thickness deep, 2-3 cm apart within the furrow (for 35 seeds/m of furrow). For wheat, dig furrows 20 cm apart. Plant seeds 2 cm apart within the furrow (for 50-60 seeds per meter of furrow). These furrows are consistently made along the same lines as the previous and following maize rotations.

When you plant, try to do the whole field at once so that you get uniform germination. When maize plants are still small, each station is thinned so that you average two plants per station. This actually leads to higher yields than if you leave all three plants in the ground. Thinning the plants is often difficult for farmers at first. To help the idea make sense, you could plant two different plots using FFF methods; in one, leave all three plants at each station, and in the other plot, thin to two plants per station. Lance Edwards did this and commented that the men he worked with were amazed when they saw how much bigger and healthier the thinned plants were.

If fertilizer is to be added later as a top dressing, do so when plants are halfway to knee height (2 weeks after emergence) and straight after thinning. It can be done again (for maize) just before it tassels. Place about 5 mL of fertilizer a minimum of 10 cm from the base of the stem, on the upside of the slope.

Step 3: Potential Pest Problems

Pest problems that you might encounter are not specific to FFF. One potential problem is that rats and mice might dig up and eat the seeds. Two possible ways to minimize this are to plant as early as possible, once the rains start, and to put cobs of maize directly on the surface of the ground so that rats and mice don't dig for seeds.

Farmers are sometimes concerned about termites, but the termites are actually a blessing, not a curse. Feed them! They will eat dry stalks that are left on the surface of the ground, and at the same time create important air tunnels in the soil. They will rarely eat green seedlings, especially if decaying organic matter is available.

Chickens like to dig in mulch for food, and will sometimes cover seedlings in the process. This can be a problem. Fence them in (or out) where possible.

Step 4: Weed Control

Weeding is extremely important. If weeds are removed when small, they will be much easier to get rid of. Try setting aside 2 hours a day for weeding. Most weeds can be hoed just below the surface to cut off the roots, but creeping grasses will need to be pulled out. Weed (with a hoe) while moving backward, so that you don't inadvertently replant hoed weeds by stamping them into the soil. Weeding should not be much of an issue if you hoe weeds when they are very small and if you have a thick layer of mulch on the surface of the field. Often three 10 day rotations are recommended.

Step 5: Harvest and Postharvest

Once maize is fully mature, break off the tops above the cobs. These broken off parts can be used as a portion of the mulch. After the harvest, step on the base of the maize stalks so they lie on the ground between the rows. Leave them on the surface of the soil to improve the mulch and to help reduce weeds. This process also breaks the life cycle of the maize stalk borer, because the borer pupates in the stem at the very base of the plant. If the stump is left upright, the pupa survives; if the stump is knocked flat, the pupa usually dies.

A final weeding just before harvest (while maize cobs are drying on the plants) is extremely important to minimize the amount of weeding necessary in preparing the field for next year's crop. The plants left in the soil at the end of the season produce the seeds that will be next year's weeds. If left standing in the field, just one pigweed plant can produce 600,000 seeds!

Postharvest control of pests in stored grain is important, to prevent losing much of the crop to insects or rodents.

Crop rotation with legumes is important to improve the soil's structure and fertility, as well as to break disease cycles. Aim for one third of land area to be under rotation (e.g., plant legumes on one-third, maize on the other two-thirds). If you follow maize with soy or another legume (e.g., beans or groundnuts), you may not need to add fertilizer. Because soybean seed is planted closer than maize, you will dig a furrow instead of using the planting stations.

Success Stories

Grant Dryden is a principal teacher on the instructional DVDs. In an October 2007 report, he shared that rates of FFF adoption in Malawi are growing. In Kuselema, one leader "acknowledged they were expecting to receive seed and fertilizer but had instead received something far more valuable—wisdom." Dryden also wrote that many farmers implementing the approach at high standards were seeing nine-fold increases in yield of maize.

Megan Johnson, a former ECHO intern, learned about FFF at ECHO and later had a chance to work directly with Brian Oldreive in Zimbabwe. In one letter, she shared the following: “I witnessed the impact [of FFF] firsthand last week after traveling with Brian to a village called Maseembura. Here Pastor Simon has a cement home, car, bore-hole and farmland. Seven years ago, when he started FFF, he had only two small huts and land. In September, 2 months before the rains come, his land is prepared—planting holes are dug and mulch is placed.”

Across the road from his home live two older gentlemen on their homesteads (a grouping of huts alongside their farmland). They are widowers—thin, frail, toothless men in their 70’s, who also have faithfully prepared their land according to [FFF] and are ready for the upcoming rainy season. Their homesteads are neat as a pin, complete with beautifully pruned bougainvilleas, mulberry bushes, a mango tree and a flowering trellis over the entrance to their compound. Looking across their farmland, you see rows and rows and rows of planting stations, perfectly lined up and covered with mulch. The yields on these farms have increased so that these men are now making a profit! As a result, they are now in the process of building a small orphanage for local children. Isn’t that the way things are supposed to be? Blessed to be a blessing.

Megan also spent a month-and-a-half doing agricultural work at Eden, an orphanage in Zimbabwe. She and Sammy, the vegetable garden supervisor, decided to plant several sections of fields according to FFF.

She wrote:

We cleared a 100 m portion of field and planted several sections with maize (one fertilized with manure, one with chemical fertilizer), tomatoes, cabbages, butternut squash, groundnuts, and two varieties of beans. We also planted watermelons in another location and another 100 m section of field with maize. This was all done using the FFF principles of no-till, permanent planting holes (with fertilizer/manure placed directly in each hole rather than scattered across the field) and mulch cover.

We’ve had amazing results so far and the fields look beautiful! The watermelons were planted in rock- hard soil that was part of an ant heap (containing a lot of clay). Looking at the condition of the soil, you would have doubted any little seedling could push its way up through that tough crust, but they did and those watermelons are the best looking crop we have!

Lance Edwards, a former ECHO employee, worked in Mozambique for two years promoting FFF. He reported that people with whom he worked were hesitant at first but had subsequently asked for training and information.

A Special Success Story: Emile Never Understood that Agriculture was so Easy!

by Robert Sanou

Since childhood, Emile (Fig 1) had only been exposed to agriculture, always using the same methods and techniques to grow his food.

A radical transformation in Emile’s vision and understanding about agriculture occurred in September 2010 upon attending ECHO’s First West Africa Forum held in Ouagadougou. When he returned from the forum, he began preparations for the next farming season. One of the courses that had the greatest impact on him during the forum was the “Foundations For Farming” workshop. As soon as the first rains hit, he began to apply all that he had learned about this method. For the first year, he applied FFF to 4.5 hectares (11 acres) of maize. This new technique was completely different from his normal agricultural practices. Emile did not plow his fields like all his neighbors did. Many asked how such a field could ever succeed. To the surprise of all, the field developed very quickly and produced high-quality corn. Many of his neighbors questioned him on his magic and secret for success.

In terms of his production results:

- Emile was able to save significant funds because plowing this area would have cost 112,500 CFA (US\$245) at 25,000 CFA (US\$55) per hectare.
- He purchased no chemical fertilizer for his field which would have cost 299,000 CFA (US\$650) according to the local agricultural standards.
- Production increase is already evident even though Emile had not yet harvested his field by the time this was written. He believed it will be significantly better than previous years.

- Emile's field is so successful that the Ministry of Agriculture has taken note and is using the field as a model for the region.
- Emile's field was more resilient to drought compared to neighboring fields.
- Finally, without going into all the details, Emile's production was selected to serve as seed by the Ministry of Agriculture. It should be noted that a bag of 100 kilos of selected seed costs about 35,000 CFA (US\$76) versus the normal 10,000-to-12,000 CFA (US\$22–\$26) for a regular bag.

In summary, Emile rediscovered agriculture as both simple and profitable. He hopes to continue with FFF and firmly believes that agriculture can change the lives of others if they can be given the same information he received during the ECHO training in Ouagadougou.

Conclusion

FFF seeks to align agricultural practices with patterns that are seen in creation—land that is not tilled, with a blanket of organic matter. FFF also emphasizes good management practices, and has proven greatly successful where it has been implemented wholeheartedly. Combined with spiritual teaching, it is a powerful tool for change and transformation, as has been experienced already in communities throughout southern Africa. We encourage you to experiment with FFF, initially on a small scale with a demonstration garden.

References and Resources

Figures are used with permission from Brian Oldreive and Grant Dryden.

It is difficult to summarize FFF in just a few pages. There are instructional materials and DVDs. We encourage you check online for more detailed information.

A "Farming God's Way Training Manual" by Grant Dryden is available from ECHO's bookstore (www.echobooks.org)

Also available from ECHO's bookstore: "Farming God's Way DVDs," a 5-disk set including: Disk 1 (Introduction); Disk 2 (Explanation); Disk 3 (Implementation); Disk 4 (Application); Disk 5 (Extension).

Foundations for Farming: www.foundationsforfarming.org/

Farming God's Way: www.farming-gods-way.org/