in this issue: farmer field schools participate in ECHO research • “sticky killer sand” the grass is greener • planting churches, spreading seeds • intern spotlight: Jack Olsen
Multiplication is God’s idea. It was launched in the beginning; it is fully incorporated into nature; it is at the core of the Gospel; and, it is intended to be a significant means of blessing.

Multiplication is also central to ECHO’s Strategic Plan — a key indicator that ECHO’s work is on the right track:
— that our research efforts are relevant, scientifically sound, and fruitful;
— that our training builds essential knowledge and skills;
— that the plants, practices, and appropriate technologies we offer are practical and effective; and,
— that ECHO’s equipping work brings life-changing opportunities to women, men, and children.

In fact, we consider multiplication to be so essential in the work that we do, that we committed to have an independent research firm conduct assessments of ECHO’s multiplication rates. To obtain these assessments, independent researchers surveyed ECHO’s training participants to see if they valued the training enough to pass it on, and to find out how many people they shared this new knowledge with. These assessments are now complete, and we have included a Special Multiplication Assessment Report for you in this issue of ECHO News.

The assessed multiplication rates are quite remarkable! What this means, in part, is that your giving and prayer has been instrumental in the transfer of transformative knowledge to more than 182,000 small-scale farmers/gardeners in one year alone! As they have applied and shared this knowledge, over 1.7 million men, women, and children have benefited.

Of course, there is much, much more to be done! But we are humbled and encouraged by these results. We are most grateful to the Lord for using and blessing ECHO, to you for generously investing to make this remarkable work possible, and to the thousands of men and women around the world who have transferred the knowledge and skills that ECHO has shared with them.

Please join us in giving thanks for ECHO’s multiplying impact and consider how you might join with us to extend it to bless the millions of families who still need our help!

With Thanksgiving,

For God is the one who provides seed for the farmer and bread to eat. In the same way, he will provide and increase your resources and then produce a great harvest of generosity in you. 2 Cor. 9:10 NLT
Loupa Pius first attended an ECHO symposium in East Africa in 2015, and was so encouraged that he attended again in early 2018. In his own words, he describes what he gained from this recent symposium:

“I now have the ability to conduct and plan together with the community of Karamoja [Uganda]. I can facilitate a training session and use ECHO publications as my guiding notes and share areas of best practices elsewhere in my home area.

Because of ECHO, I was able to interact with many people and experts like the Co-Founder of the FAO Pastoralist Knowledge Hub. Due to that I have full access to information in the knowledge hub. I was also able to meet some online friends I have never seen physically but now with whom I plan to partner.”

“I can facilitate a training session and use ECHO publications as my guiding notes...”
Farmer Field Schools Participate in ECHO Research

by Dr. Tim Motis

When research involves small-scale farmers, everyone wins!

Life as a missionary kid in several African countries (Eritrea, Ethiopia, and Liberia), combined with a love for plants, gave me an appreciation for the challenges farmers face. When it came time to decide on a college major, horticulture seemed like a natural choice. Graduate school followed out of a desire to do research on behalf of farmers like those I remembered growing up. Research that benefits farmers is something that I view as a personal calling. What a blessing it has been to pursue that vision with ECHO since 2003!

Much of ECHO’s research is done by our own staff. Whether on a field or laboratory scale, these projects are our chance to think outside the box, innovate, and validate potential hunger-related solutions that have not been extensively studied by others.

“This article, though, is focused on what we call “disaggregated research,” experiments conducted by farmers or members of ECHO’s international community of practice who serve farmers. These studies typically revolve around innovations and practices that we have tested previously, are fairly certain will succeed, but could be sharpened further through farmer evaluation and feedback.

Grafted avocados, originally from ECHO, were distributed to local farmers. For the last five years, over 100 trees were distributed annually. When research involves small-scale farmers, everyone wins!
As an example, in 2016, with funding from the Conservation, Food, and Health Organization, ECHO launched a research effort across multiple climatic zones in Southeast Asia to help us do a better job of recommending green manure/cover crops (gm/cc) which are plants grown for soil improvement. With guidance from ECHO staff, test plots were established and managed by development workers and farmers they work with. One of many findings was that gm/cc growth was linked more strongly to soil than air temperature. Results were used in developing an online legume selection tool and summarized in a formal ECHO publication. Thus, members of the global ECHO community had a part in developing informational resources now available to countless others through our agricultural website, ECHOcommunity.org.

Beyond the technical information gained, the trials opened up a level of farmer engagement not possible in Florida. Farmers helped with planting and plot layout, they could see for themselves how the various gm/ccs grew, and they could ask questions and learn from each other. One farmer, as a result of his involvement, went on to plant gm/ccs in his own field, and experienced increased crop yield as a result.

As farmers participate in the research process, they become experimenters themselves. That concept is key to the Farmer Field School (FFS) model in which farmers are both the learners and experts. This year ECHO has been able to apply the FFS model to evaluate a promising way to intercrop corn with gm/ccs. We call this method “2-4-2,” since it entails a planting sequence of 2 rows of corn, alternating with 4 rows of cowpea. It was developed by the International Institute of Tropical Agriculture in West Africa. After seeing it in South Africa—when ECHO conducted numerous trials there—we decided to try it out at ECHO in Florida. We then wrote about what we learned in our quarterly agriculture publication, *ECHO Development Notes* (EDN). Having read about 2-4-2 in EDN and seeing the Florida trial, Robert Morikawa, Technical Director of Plant With Purpose, proposed that we create a protocol to evaluate 2-4-2 in six sites in the Democratic Republic of the Congo (DRC).

Doing so presented some interesting challenges as far as instrumentation and language. For instance, we had to figure out an appropriate unit of measure to use for reporting grain/seed yield in a setting where scales could be hard to come by. To remove communication barriers, procedures were translated into Swahili, and technical concepts (such as plot layout and harvesting methods) were illustrated with diagrams that Morikawa drew by hand.
Six 2-4-2 plots were established by the end of October in 2017. Harvest results are not yet in, but preliminary reports are encouraging. In a February update, Morikawa shared this:

“I spoke to Birori [Birori Dieudonne works with Ebenezer Ministries International, who partners with Plant With Purpose in the DRC] at our international meeting last week and he said everything was going fine. Farmers are showing a huge interest in cowpea, not only because of the potential green manure technology, but apparently it has a pretty good selling price. In fact, it seems like some groups may be planting production fields for multiplication in anticipation of good profits...”

At another Plant with Purpose site in the Dominican Republic, three FFS groups have implemented 2-4-2 trials in the upper Ozama River watershed and in a community called El Llano. The cowpea plants are loaded with pods, and the corn stalks grown in the 2-4-2 system are much taller than the corn that was planted in a traditional manner. Community members are taking note and comparing the harvest potential.

That means that, what started as a single field experiment on our Florida campus, is being tried by nine Farmer Field Schools. Many lives will ultimately be impacted through these and similar efforts!

As a researcher and ECHO staff member, there is nothing more rewarding than seeing farmers’ lives improved by a concept that we had a role in developing and sharing with our network. Your support of ECHO helps make this possible, and we are extremely grateful.

A Farmer Field School trial in the Dominican Republic, showing traditional maize (right) in comparison to a system in which two rows of maize (left) are alternated with four rows of cowpea (middle).
The excessive rains of Izabal, Guatemala are a stark contrast to the semi-arid climate I am accustomed to in Kitongo, Tanzania. At Frutas Del Mundo Farm, where I spent four weeks as a volunteer in February 2018, I spent many hours digging in the rain, cleaning drainage canals to ensure the water flowed to the river. I observed the importance of planting fruit trees where they have good drainage, a benefit to slopes or mountains. I visited a farm along the shore of a river where I saw an obvious difference in the growth and health of rambutan trees growing on slopes versus flat land. All this will be helpful knowledge for my time as the Tropical Highlands or Mountain Intern at ECHO.

There are beautiful benefits to water coming from the mountains versus from a lake. Despite the fact that I grew up by Lake Victoria, the second largest lake in the world, water conservation was always on our minds. So much of my past agricultural experiences included fixing the water pump, hauling water by hand, and building water storage tanks. When plants are being irrigated by gravity, no source of energy is required! Infrastructure is needed of course, but no gas-powered pump.

I also enjoyed spending time in the Zacapa department of Guatemala because its climate and plants are very similar to Tanzania. In Teculutan, Zacapa we visited Saul Larios‘ El Palmo Farm, where Don Saul has a tree nursery with mangoes and citrus. His nursery is at the base of a cloud forest, resulting in a constant source of water from a river supplied by the forest. He irrigates his nursery by allowing water to flow through canals that his plant bags are sitting in. It requires little infrastructure and no energy source. What a blessing to have mountains supplying the water!

Coming to ECHO, I realized that I want to try growing everything. But something I have been shown these past months is that each climate has its benefits and disadvantages. Guavas and mangoes thrive in dry climates, while rambutan and mangosteen prefer it wet. Some vegetables taste much sweeter when grown at higher elevations. The truth is some things don’t grow well, or don’t grow at all in certain areas, but other plants can thrive. I was wishing my home in Tanzania had the rainfall Frutas Del Mundo receives, but then realized that there were many things I could grow at home that can’t grow in Izabal.

I am always looking for the greener grass on the other side of the hill (or the other side of the pond!), but the dry grass has its benefits too! I will probably be learning this lesson for the rest of my life in more than just the agricultural side of things; and I appreciate how it has been impressed upon me through the examples of the diverse landscapes of Guatemala and through my learning at ECHO.

The Grass Is Greener...
Learning Life Lessons Through Agriculture
By: Launa Tanner, ECHO Tropical Highlands Intern

Top: Frutas Del Mundo Farm hosted ECHO Intern Launa Tanner for a volunteer exchange program. Bottom: Launa’s childhood home in Kitongo, Tanzania.
A Grafting Exchange was organized by the ECHO Latin America/Caribbean Impact Team in partnership with Frutas del Mundo Farm in Izabal, Guatemala. ECHO Staff and Grafters from several farms taught and learned grafting techniques for tropical fruit trees. Kelly Wilson, former ECHO intern, is now working for the Maya Health Alliance in Guatemala, and was able to help coordinate and participate in the grafting exchange.

You Could Be an Ambassador or Docent

Each winter, Ambassadors and Docents are refreshed and refueled to share the mission of ECHO with guests in Florida and around the nation. Is God calling you to share? Email Danielle at dflood@echonet.org to learn more about this program.

Follow us on Instagram for pictures of ECHO’s work all around the world. #echofightshunger

Through STEM@Work, high school students were able to test the most efficient methods of cooking, build bricks out of clay, and learn the process for making potable water!

#echofightshunger
5th Grade Passion Project

Three fifth graders from Heights Elementary School joined together to raise over $535 to support our growing seed banks around the world! Sarah started a GoFundMe page, Hannah placed a donation box at a local business, and Sophia invited friends and family to support the goal!

Beyond ECHO’s Network

Twenty-five leader farmers and government officials from Limpopo, South Africa were trained for five days thanks to ECHO through Willow Creek Church and the Limpopo Church Network.

Not your typical farm! The Annual Global Food and Farm Festival introduced thousands of people to ECHO’s mission in a new way. Left: The children’s activity at the Semi-Arid taught about the scarcity of water in parts of the world, the work it takes to collect it, and how we can conserve it at home. Right: Families learned about Appropriate Technology at the Blacksmithing Demonstration.
It is not an ordinary day at Christian Missionary Fellowship (CMF) in Arusha, Tanzania. On normal days, students don’t eat cake or pelau, a special dish made with rice. They don’t wear beautiful handmade clothing. They don’t dance and sing together on stage. But today is graduation day. And with their certificate comes a gift of ECHO seeds.

For 12 weeks, these Tanzanians have been trained to plant churches in areas that have none. CMF, a global missions team aiming to create dynamic Christ-centered communities, has a pastor training class held in Tanzania.

From building houses to sewing, the training focuses on one subject each week. During the week devoted to agriculture, CMF students learn about Zai holes, keyhole gardens, and Moringa production. The course is called Farming God’s Way, and ECHO serves as a resource to CMF students through this training.

After graduation, CMF graduates often reside in rural areas that are three to eight hours away from a city. Many Tanzanians call this area “the bush.” In the dry season, the hard, cracked ground releases thick dust. In the rainy season, the humidity drapes over the land like a heavy, wet coat. Water requires a ten to twenty minute walk. But the countryside is magnificent. Communities are spread apart by miles of peaceful, grazing livestock. Families have many children, and they greet you with smiles.

Because many people living in “the bush” are pastoralists, they drink a lot of milk and don’t have access to enough vegetables. These CMF graduates hope to spread the love of Jesus by offering assistance through the skills they learn in their training, including agricultural support.

The relationship between ECHO’s East Africa Regional Impact Center and CMF began in 2014 when Brian Lawrence, a former ECHO intern, connected with Megan and Michelle Moss, two missionary sisters teaching Farming God’s Way classes. In 2015, former ECHO Intern Stacy Reader helped to strengthen the relationship between the organizations through the implementation of more sustainable agricultural demonstrations.
Reader became acquainted with CMF while working at ECHO’s East Africa Impact Center after her internship. She had the chance to meet with Megan and Michelle and was hired by CMF as a consultant.

“They hired me because they saw that their pastors needed training in literacy, discipleship, business, and building, but they also needed training in sustainable agriculture,” Reader said. After finishing her five month project at CMF, Reader accepted a position at ECHO Florida and now works as the Research and Publication Associate.

Before the CMF training begins, many students come without any formal education. However, the students are motivated and learn quickly. They view the opportunity to expand their skills as a gift and are eager to apply what they have learned.

“That is why we teach them different things like building, sewing, and solar power to give them different skills to offer,” Losaran Mollel said. Mollel is on CMF’s National Leadership Team and has worked with CMF since 2002. “When they come here, we want them to go back with something, to show that they are different people now.”

In Swahili, Mollel would be considered a “fundi” of many trades. A skilled craftsman of many things, he can build houses, work with electricity, solar power, and more. Mollel helps plan every class the students take. He witnesses how God equips the students. Week by week, he sees the students grow more confident with the skills they have learned, giving them useful abilities for the future.

During the Farming God’s Way sessions, Mollel drives the CMF van down the road to ECHO so students can receive hands-on experience. He watches them learn these helpful skills for the first time and leave the program with what he calls “something new in their hearts.”

As a result of successful agricultural trainings, ECHO staff members are invited to attend CMF’s church planter graduation ceremonies. This year, ECHO’s East Africa staff prepared 65 packets of seeds as gifts to the graduates.

Giving seeds as a graduation gift is not only part of the celebration. It is also a symbol of the future growth and life graduates will bring to their remote mission fields.
Penn State Chemical Engineering department partners with ECHO to test promising results in natural water filters.

When Dr. Stephanie Velegol stepped up to the podium at ECHO’s International Agriculture Conference to share about her “moringa sticky killer sand” no one quite knew what to expect. What they learned, though, was that scientists in universities are actively looking for ways to improve clean water initiatives around the world, that ECHO is a key part of the solution, and that using moringa in a sand filter has incredible potential.

Dr. Velegol’s thesis stems from the water purification properties of the moringa seeds. ECHO teaches that if you use a seed in a liter of water, the crushed particles work to attract pathogens and particles to themselves, causing these larger clumps to settle to the bottom. This will clean water to about 90-99 percent. Though still not able to prevent illness, this is a huge step forward. Dr. Velegol’s research takes these properties a step further. She has proven that if you crush the moringa seeds to release the natural proteins, and then mix it with sand, the moringa proteins bind onto the sand giving the sand greater effectiveness to both attract particles and kill pathogens found in the water. Over the last eight years, she has published numerous papers on the subject in collaboration with many chemical engineering students using theses tested and proven in her lab.

Dr. Velegol’s research is exciting, and she has reached out to ECHO to help facilitate further testing, refinement of the technologies, and partnership to share the knowledge. In March, a team of Penn State engineering students came to ECHO to conduct field trials on a method of preparing and constructing real moringa sand water filters.

For five days, the students spent time with ECHO’s Appropriate Technology Manager, Elliott Toevs, building two filters out of bamboo, and two out of PVC plastic. The objective of this effort was threefold: 1) test this promising method of water filtration outside a laboratory environment, 2) introduce the Penn State team to community development principles and deepen their understanding of the context in which this technology may be used, and 3) teach ECHO the process of preparing the treated sand and building a working filter.

Initial results are promising as they confirmed that "sticky killer sand" was achieved, reducing the contamination count of E. coli in water from 129.9 colonies per 100 milliliters to less than one colony per 100 milliliters or 99.99 percent, nearly the level for drinking water set by the United States.

These results give a green light to begin testing various filter designs and preparation methods with the end goal of developing a filter that can be easily produced and used while maintaining the overall effectiveness, and making this research accessible throughout ECHO’s global network.

There is more research to be done, and a long road ahead before we promote these sand filters, but these preliminary steps today put us on the road to a promising future of clean water.

Bamboo and PVC serve as canisters for sand treated with moringa that has the potential to arrest pathogens and purify murky pond water to 99.99% clean.
Biblical Basis for ECHO

2. Creation Proclaims the Beauty and Majesty of God

In previous issues of ECHO News, we introduced this series which will be exploring Biblical themes that provide the foundation of ECHO and agricultural missions. This issue examines the second theme, “Creation proclaims the beauty and majesty of God, and the power of agriculture to convey spiritual truths.”

All of creation is a witness to God’s greatness. In the Psalms we read: “The heavens declare the glory of God, and the sky above proclaims his handiwork.” (Psalm 19:1)

A thoughtful look at the world makes it so clear that there is a creator. Scripture teaches, “Since the creation of the world, God’s invisible qualities — his eternal power and divine nature — have been clearly seen, being understood from what has been made, so that men are without excuse.” (Romans 1:20)

That is a sobering statement. The witness of creation to God’s existence is clear.

Creation was also intentionally designed to illustrate spiritual truth.

Jesus intentionally designed the stars and the seas, the needs of plants and animals, and everything else in all of creation to illustrate spiritual truth. When he uses object lessons and metaphors from His own creation, He is revealing the purpose behind His designs.

For example, Jesus created branches to bear fruit when they are connected to the trunk. He did this to visually remind us that “He is the vine; we are the branches. If we remain connected to him, we will bear much fruit. For apart from Christ we can do nothing.” (John 15:5).

Jesus created birds and wildflowers as a tangible reminder of God’s provision. Jesus explicitly said, “Look at the birds. They don’t plant or harvest or store food in barns, for your Heavenly Father feeds them. And aren’t you far more valuable to him than they are? Can all your worries add a single moment to your life? And why worry about your clothing? Look at the lilies of the field and how they grow. They don’t work or make their clothing, yet Solomon in all his glory was not dressed as beautifully as they are. If God cares so wonderfully for wildflowers...he will certainly care for you. Why do you have so little faith?” (Matt 6:25-34)

Flowers and birds were created as daily reminders of God’s provision!

The soil needs rest and restoration after production. You can’t plant corn in the same field year after year and expect production to increase. It will decline. Soil needs to be intentionally restored by adding nutrients and giving it rest. Our need for rest and restoration is so fundamental, it’s included in the ten commandments. (Deut 5: 12-15)

These examples could go on and on. The point is that we are part of creation. The principles that lead to the restoration of soil, the principles that lead to the healthy growth of plants...these principles are intentionally placed in creation to teach us what we need to restore our soul and to thrive in our relationship with God.
My name is Jack Olsen and I’ve been at ECHO with my wife, Abigail, and our two sons for just over a year. I am the intern who cares for the tropical monsoon area of the farm, along with the flocks of chickens and ducks. I’m originally from Perth, Australia, and I spent part of my childhood living in a missionary training community. Prior to coming to ECHO, I studied religion and philosophy at Berry College in Rome, Georgia, and managed a 10-acre vegetable farm. As followers of Jesus, Abigail and I hope to live in a way that reflects our place as the hands and feet of Christ and as stewards of God’s creation. Our time at ECHO has been one of growth in this identity, learning vast amounts of skills and knowledge, and also having lots of fun.

Being at ECHO has given me the incredible opportunity to experiment with techniques and technologies specifically aimed to help small-scale farmers around the world. My knowledge of plants has broadened significantly, not only through memorization of binomial nomenclature (scientific names) in the seed bank, but also through planting, tasting, and cooking things myself. I have particularly enjoyed learning more about staple crops such as Job’s tears, millet, sorghum, and rice. I have been able to explore tool construction and modification through blacksmithing, as well as the art and utility of the scythe and sickle. I’ve been able to practice breeding chickens and ducks, learn which breeds are best for the tropics, and discover the multitude of ways that chickens can replace tractors. I have also been able to participate in and learn about the relational side of development work through my time at ECHO Florida and during my visit to the Asia Impact Center in Thailand.

During my internship, I have grown both personally and spiritually through mentorship and friendship. It has been encouraging to work alongside so many knowledgeable and enthusiastic individuals who are passionate about living out their faith. Our time at ECHO has prepared us to continuing our work with agricultural education and training. Though we’re not certain of the details of our next step after my internship ends, we hope to walk a path of peace, honoring God through our work with creation and our relationships.
Can I Afford to Help?

College. Weddings. Aging parents. A health crisis. So many seasons of life leave us questioning whether we can afford to help the causes we care about. Our compassion isn’t lacking, but neither are our expenses.

However, a realistic look at our finances doesn’t mean we have to close our eyes to the needs God puts on our hearts. You can protect your current cash flow while still planning to make a lasting difference. Consider one of these practical, non-cash giving options:

**Life Insurance** - You don’t need a large estate or high net worth to make this type of gift. Donating a life insurance policy, or simply naming ECHO as a beneficiary, is often a way to make a much larger gift than you could afford during your lifetime. Having proceeds from your life insurance policy paid directly to a charity can also be a way to avoid estate taxes.

**Retirement Accounts** – Enjoy the blessing of knowing that your hard-earned retirement assets will bring hope to families in the future. By planning ahead and naming ECHO as a beneficiary of your retirement assets after your death, you can also help to reduce the burden of income taxes passed on to your estate and heirs.

**Wills/Bequests** – Without spending your resources right now, you can still make a meaningful and lasting statement about what matters most to you. With flexibility in the ways to give through your will, you can steward your legacy to bless both your loved ones and families ECHO will continue to serve around the world. For example, your will can provide for your heirs while also specifying that a designated amount or a particular percentage goes to ECHO. Another option is to leave what remains of your estate to ECHO after all the gifts you wish to leave for your loved ones have been made.

For more information about how you can meet your philanthropic goals by partnering with ECHO, please call Amy Wiggins, Director of Advancement at 239.567.3341 or visit our website at https://www.echonet.org/gift-options/.

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If you could pluck your favorite characteristics from the earth’s bountiful variety of fruit and put them together what would your fruit taste like?

Imagine for a moment, a fruit that possessed the deep purple-copper skin of the concord grape, a pleasing aroma reminiscent of the apple, the juicy, soft texture of a mango and the pleasant balance of acid and sugar that makes the honeybell tangelo so popular and you’ve got the Caimito, a.k.a. Star Apple (Chrysophyllum cainito). Add to these characteristics a convenient size and shape (think medium tomato), small, unobtrusive seeds, and a heavy-bearing nature and you’ve got the makings of a star – apple that is!

Other features include its attractive tree-size, shape, and colorful leaves. The round, spreading, evergreen canopy is full of oblong leaves, dark green above and copper-brown underneath. Most trees bear heavy crops and the fruit is a colorful addition to the beauty of the canopy.

Caimitos are usually eaten fresh, cut in half and scooped out with a spoon. But also try them in smoothies and other frozen desserts.

**Caimito Sherbet Recipe**

3 cups ripe caimito, seeded and mashed  
1 12 oz. can Evaporated Milk  
1 cup sugar  
2 cups water

Instructions:

1. Mix all ingredients and place in a container. Freeze until partially set.
Impact Across Asia

In October of 2017, the ECHO Asia Agriculture and Community Development Conference in Thailand equipped participants from over 17 countries throughout Asia. Seven other countries were also represented.

*Of the 227 participants, nearly one-half mentioned their “home country.”